

ANALYSIS OF POP MUSIC AND COMPOSITION OF A GENERIC SONG

The musical score is written for a generic song in 4/4 time, with a tempo of 90 beats per minute. The key signature is one flat (B-flat). The score consists of three systems, each with four staves. The first staff of each system contains the melody, the second staff contains the bass line, the third staff contains the chords, and the fourth staff contains the lyrics. The melody is composed of eighth and sixteenth notes, with a tempo marking of 90. The bass line is composed of eighth notes. The chords are composed of triads and dyads. The lyrics are written in a generic, placeholder style.

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Abstract

En aquest estudi, partint de la nostra hipòtesi que el terme "genèric" significa, adjunt a una cançó, que conté un nombre substancial de trets notablement recurrents en un grup de peces musicals, hem analitzat la música pop actual per tal d'entendre les seves característiques i tendències, i hem descobert a través de mètodes empírics què fa que una composició soni "genèrica".

Vam sotmetre al nostre estudi un total de 74 cançons, en les quals vam compatibilitzar les aparicions de múltiples elements pertanyents a la temàtica, al tempo, a la durada, a la instrumentació, a la dinàmica i a l'estructura, a més d'analitzar-ne els aspectes melòdics i lírics.

Finalment, vam unificar els resultats en una cançó pop de manera congruent. Ens vam inspirar en una suma de cançons populars i, sobretot, ens vam assegurar de només afegir elements que poguessin ser corroborats pels resultats proporcionats per l'anàlisi del gènere. Malgrat les seves mancances, satisfà amb prou força el nostre objectiu i confirma, en certa mesura, la nostra definició de "genèric".

Hem trobat que la música pop és repetitiva i simplista, amb poca o cap variació dinàmica, poca complexitat instrumental i melodies minimalistes que repeteixen i desenvolupen fragments curts, entre altres característiques.

Els resultats d'aquest estudi han estat en ocasions sorprenents, sobretot per mostrar una varietat insospitada en elements com l'estructura i l'harmonia.

In this study parting from our hypothesis that the term “generic” means attached to a song that it contains a substantial number of traits that are remarkably recurrent in a group of musical pieces, we analyse today’s pop music in order to understand its characteristics, tendencies, and discover through empirical ways what makes a composition sound “generic”.

We subjected a total of 74 songs to our study, from which we compatibilized the apparitions of multiple elements that concern theme, tempo, duration, instrumentation, dynamics, and structure, in addition to analysing their melodic and lyrical aspects.

Finally, we wrote a pop song that unified the results in a logical way. We took inspiration on a sum of popular songs and, importantly, made sure to only add elements that could be corroborated by the results provided by our analysis of the genre. Despite its shortcomings, it sufficiently satisfied our objective and confirmed, in some degree, our definition of “generic”.

We found pop music to be repetitive and simplistic, with little to no dynamic variation, low instrumental complexity, and minimalist melodies that repeat and develop on short fragments, among other characteristics.

The results of this study have been surprising at times, mainly for showing a surprising variety in some things, especially in elements that regard structure and harmony.

Introduction

When we listen to music on Spotify or on the radio, we can often notice one or more song that stick out for how uninteresting they are. We commonly call them generic, a word that isn't recognized in this context in the dictionary. The term is associated with the composition sounding exceedingly like other songs and can be defined in this context as being dull or boring, although there is no specific meaning to the word.

A genre of popular music that is especially subject to such term is pop, perhaps due to its commercial nature. This one is currently one of the genres most listened to worldwide.

For the sake of this study, we assign a potential definition to the term and, starting from that, we take a closer look at today's pop music in order understand its makings, tendencies, and, finally, discover what makes a composition sound generic; to the end of writing and recording within our capabilities a song that represents our discoveries.

Thus, we will carry out a predominantly musical, but also lyrical analysis on a sum of pop songs popular at the time, count the tendencies of each parameter, look for important patterns, and write a song with the results of the prior in foremost importance. We will only be looking at the compositional aspects of the songs, meaning the aspects strictly related to editing and mastering¹ will be mostly ignored.

We adopt here a particularly statistical point of view to get a better understanding of the tendencies music has at the current time.

We take on this study, as people who have little knowledge of the current mainstream of music, to the ends of getting a better understanding of pop music's current tendencies. We intend to define its characteristics as well as its uniformity, which, from our speculation, should be especially high. Parallely, we want to define genericity.

We are motivated by our interest in the subject of the tendencies that arise in music, in the characteristics of pop, which we believe to have been given too little interest, and in being able to write pieces² based on contemporary aesthetics.

This paper takes an overview of today's music as a means of inciting reflexion and interest in the genre in question. And we hope from our love for the subject that interesting results and a new perspective are shown at its closing.

Our research is based mainly on books, but it also cites scientific studies and articles; PDF documents and websites dedicated to teaching or belonging to teaching institutions, such as Institut Obert de Catalunya's Moodle page; furthermore, we will be looking at an online discussion about the matter to the ends of showing the general opinion.

¹ Mastering: The last step of sound production when the sonic qualities (Volume, clarity...) are improved.

² Piece: Musical composition. Broader than the term "song", which implies the presence of singing voices.

Theoretical section

As should be of general knowledge, music is a very broad term referring to an equally large batch of ordered sounds. There are uncountable pieces of different styles and artists, each distinguishable from the others and of varying complexities that can reach very high levels. We are not implying that analysing a whole musical genre is a simple task, which it certainly is not on most occasions. Yet, we believe in the possibility of this study mainly due to the nature and inner workings of the artistic medium, which is in constant change and evolution in submission to historical and geographical factors and, most importantly, sticks to specific rules.

That is indeed how music is written and perceived, in relation to its principles and, as we will discuss further on, to familiarity. In the upcoming pages we will summarize the necessary knowledge as to what we will be looking for and why it should be possible to determine certain trends in the genre we have chosen to research.

1. The genericity of music

There is no doubt that, from when it was first conceived, music has been subject to trends and aesthetics born from culture, geography, and historical events. Such thing is made clear by the changes the art has experienced through the pass of time. We call the results styles, which refer to historical tendencies. We could, for example, compare the music written by Baroque composers such as Bach with the one written by Classical composers such as Mozart. The differences may pass unnoticed by the least familiarized listeners, but they are not inexistent. The former would compose many melodies, each unique and ornamented, that complemented each other to convey a single emotion in a constant intensity, whilst the later, a group of homophonic phrases that expressed a range of emotions; the piece would have a clear structure, which the intensity would follow in its variation. It is due to these peculiarities that the two are differentiated.

Even within modern music, we humans are able to identify the different genres subconsciously. Thus, we can differentiate Jazz from Hip Hop and from pop without needing the specific knowledge on what differentiates the three.

That is not to say that genres within the style are especially distinct, as, albeit they tend to evolve and change in different directions, they do so whilst maintaining existing ideas and innovating in little aspects. Pop itself has been influenced by Rock, Blues and Electronic, among many others that also pertain to the contemporary style. Every contemporary piece is, in fact, similar in many ways to the rest. They all stick the current preferences.

Thus, style refers to the sum of the peculiarities that identify a historical tendency, which may include, but is not limited to: instrumentation, dynamics and rhythmic patterns.

The musical market appears to be responsible for some of the most recent tendencies modern music has adopted. For instance, volume has increased while variations in intensity have become less important. In the same way, the duration of every composition has decreased ever since the fall of Rock and Roll, it being now close to halving what it once was. Genre is currently used as a main way of reaching an audience, discouraging innovation over being recognizable. In consequence, some genres, and especially pop,

are subject to being called generic, a term that does not have an exact definition. The word is generally applied to songs that do not sound interesting or unique.

The topic of generic music has not passed unnoticed by online discussions, as some can be found on social media. For instance, in a Reddit post uploaded to “r/LetsTalkMusic” on July 21st, 2017, and written by user “Enenra_”, who asked for what it meant to be generic, and if music could sound generic for one person but not another, a quantity of comments suggest that “generic” music is “Basically music that lacks a strong, distinctive personality and "standoutish" qualities.”³, whilst others attribute it to being unoriginal, or worse than the works of other artists or groups. On the second question, the users imply that the perception of the quality could be linked to preferences and familiarity with the genre. In the same post, the quality of “generic” music is often criticised by the users for allegedly being something anyone could have written, thus demonstrating the negative connotation the word usually holds. But it is just as often defended for its qualities; such music is a great choice for dance clubs as well as soundtracks.

Uses of music in media appear to show the truthfulness of the last statement. In cinema, “generic” soundtracks have shown to increase sales ever since the 90s. Parallely, songs broadcasted in Eurovision can be described as “generic”, Spain’s performance in 2022’s edition, “SlowMo”, serving as an example, as it takes a “safe” approach on current Latin pop, pop, and dance music genres.

Thus, “genericity” is not an absolute attribute, but a quality linked to the individual perception of uninterestingness. That is a conclusion that could be extracted from the post, and one we agree with. Perhaps not that surprisingly, this does makes sense in accordance with the topics we will discuss further on.

As for the definition we attach to the word, we choose to define it, having knowledge of thinks that will later be explained, as the attribute of a musical piece that englobes several traits that are remarkably recurrent in the listening habits of a user, such that it appears instantly familiar, predictable, and thus uninteresting. Thus, we could say that “genericity” is linked to the familiarization the listener has with said traits. Generic pieces within a genre would thus contain a significant number of aspects common in the same, meaning we could conclude that music defined as such can be a representation of the most reoccurring troupes of a genre or style.

However, “genericity” could also be perceived from an uninterest born from an individual’s preferences in music and genre.

In conclusion, this attribute is born from the tendencies of its style and genre and could be currently reinforced by a pressure to fit in exercised by the current market. In conclusion, “genericity” could be a by-product of style, genre, and the factors that create these categories, and reinforced by the personal preferences of a subject.

3 Truthmachine32. (July 21st, 2017). Re: Basically music that lacks a strong, distinctive personality and "standoutish" qualities. Generally used for bands that feel interchangeable with other bands of the genre. I personally feel the term has merit, but that it’s something that exists on a continuum [Comment on post]. Retrieved from https://www.reddit.com/r/LetsTalkMusic/comments/6onhvw/what_makes_music_generic/

2. Music's three basic components

On the topic of defining music, its makings can generally be divided into three main concepts (melody, harmony, and rhythm) that rely on sound and its principal qualities: pitch, timbre, and intensity.

These three constitute essential concepts of music. Pitch is the height of a soundwave that results from its frequency; we assign different frequencies to musical notes. Timbre is, in comparison, a sum of frequencies that accompany the fundamental pitch⁴ and make it possible to identify the sound; it is the quality that differentiates instruments. Finally, intensity is the volume. In addition, duration is also essential due to its relationship with time. Musical notation expresses them in the following way:













Figure 1. An example score accompanied by two arrows that show how musical notation indicates pitch and time. There are some symbols that will later be explained. By ourselves.

Thus, the vertical axis expresses the pitch in accordance with the key signature, whilst the horizontal, in virtue of note values and tempo, expresses the duration and position in time. Intensity is implied by its according symbol, and timbre is usually expressed at the beginning of the score.

In relation to the prior explanation, rhythm represents, in a technical sense, the succession of elements in time. It includes duration, timing, tempo, intervals of time... patters and repetitions, on-beats as well as off-beats, and time signatures. Rhythm's perception is, most importantly, not sustained on the presence of sound, but on silence and variation in intensity, influenced, like every other musical element, on what comes before and after.




Notes in composition occur in a timeline established by the tempo/BPM, which is a number or beats or pulsations that happen periodically and regularly in a minute. Successions of sounds and their corresponding duration are conventionally compressed into the duration of one or various of these beats by utilizing the existing note values.

⁴ Fundamental pitch: Pitch that determines the height of the note.

Note values relevant to the study			
Name	Note value	Duration	Symbol for rests
Semibreve		4 beats	
Minim		2 beats	
Crotchet		1 beat	
Quaver		½ beat	
Semiquaver		¼ beat	

In this table that we assembled, the most relevant note values are presented in name, along with their duration in beats, and the shapes they take.

The duration of the sound is not only tied to the note value, as their duration can be modified. We made a table that collects three important ones.

Figure	Name	Effect
	Dot	Elevates the duration by ½ de note value
	Triplet	Divides the space occupied by 2 of the same note value into 3
	Tie	Adds the duration of the second note value to the former

Beats can then be divided into measures that are specified via the use of time signatures. Time signatures have the shape of two numbers placed vertically. The number above indicates the number of pulsations that fit into a measure, and the other, the value of the beats. Within a measure, every beat has a stronger or weaker accentuation, receiving the names on-beat and off-beat.

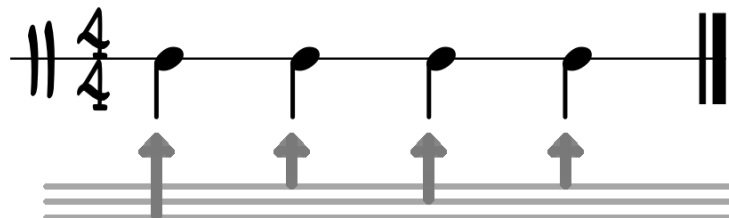


Figure 2. Portrayal of the accentuation of the beats of a 4/4 measure where the length of the arrows signalizes the strength. The first and third arrows pertain to the on-beats, and the second and fourth to the off-beats. By ourselves.

Fully rhythmical musical ideas have emerged over the course of the years that are still heavily used today. For example, setbacks, which consist of accentuating the off-beats by attacking on said time whilst placing rests on the on-beats, is present in most

contemporary popular music. Similar to this pattern, syncopation attacks on the off-time and extends the duration to the on-beat.

In contrast to its technical sense, rhythm commonly refers to the lines interpreted by non-tuned percussion instruments of the likes of drums and cymbals.

Melodies are a sequence of frequencies in time or, so to say, the product of rhythm and pitch. They are perceived as a single entity that possesses a communicative function.

Occidental music divides pitches into 12 notes that repeat cyclically in what are referred to as octaves, the interval from one note to the same on a higher or lower pitch.

These pitches are usually arranged into scales formed by intervals of notes. The distance from one to the next is called a semitone and the one compressed of two semitones is called a tone. In this manner, by making successions of intervals, modal scales can be formed, of which the most used is the major mode corresponding to T-T-ST-T-T-T-ST, followed by the minor mode: T-ST-T-T-ST-T-T.

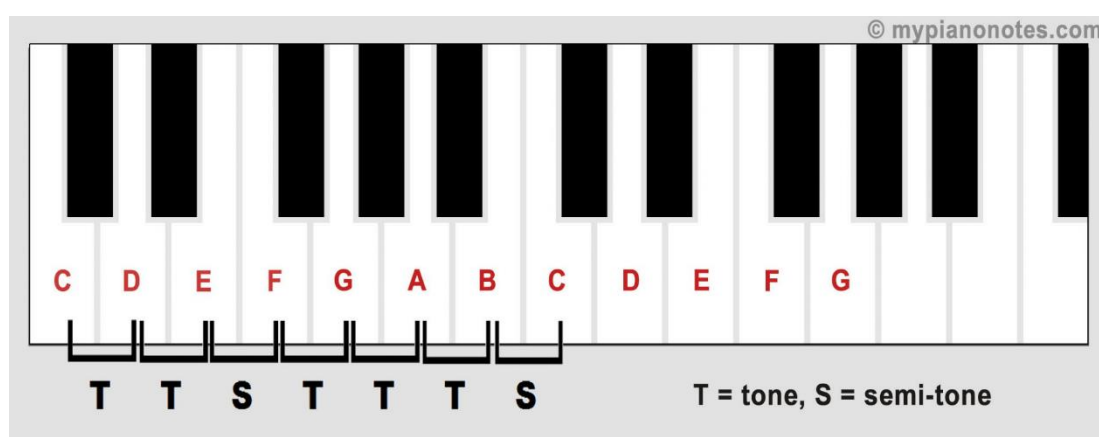


Figure 3. Major mode demonstrated on a piano. Retrieved from <https://mypianonotes.com/scale/overview/>

A key is the total of the pitches that constitute a modal scale arranged from a first note called the tonic, and their use is the norm in music. Key signatures specify the key, named after the tonic and mode of the scale, at the beginning of the score.

Musical notes are named and expressed in relation to the A Minor key, of the minor mode, as the name implies, and with the assistance of accidentals (b, #), thus being: A, A#, B, C, C#, D, D#, E, F, F#, G, G#. These notes coincide with the C Major key, which is why they are relative keys.

In the same way, notes can also be called in relation to their position in the key, making the tonic receive the roman number I. Respectively, the rests can also be named II, III, IV... These are called the degrees and, alternatively, we can use them to refer to intervals within a key. We can, in this manner refer to movements by counting steps from the root of the displacement. In accordance to music theory, the distance between I and III is of a third, between I and IV of a fourth, between I and V of a fifth. In the same way, the interval between III and VIII is of a sixth. Intervals can also be referred to in terms of steps and skips where the former pertains to notes subadjacent to the first note, and the latter to any larger distance. Each degree of the key receives a name, of which it is important to remember the tonic (I), dominant (V) and subdominant (IV), as they are the most important.

Lastly, regarding the position of pitches in scores, it is relative to the clef used. There are only 3 clefs, but the ones we are interested in are the treble clef and bass clef.

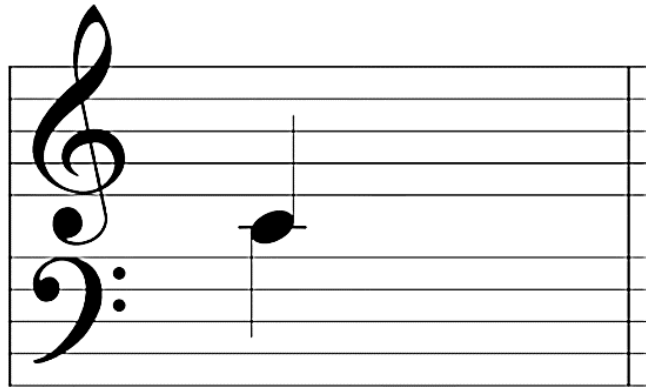


Figure 4. Middle C in both treble and bass clef. Screenshot of a YouTube video by musictheoryguy. Retrieved on July 7th, 2022, from <https://www.youtube.com/watch?v=I39Poqbu3Ik>

Thus, melodies are assigned keys, which they respect by using only or mainly the notes within it. Very often, though, they pass over the restrictions rooted in their key, whereby we talk about diatonic and chromatic notes. By this regimen, the latter are those belonging outside of the assigned key, of which there are five notes. These are written using accidentals, of which we'll discuss 3. First is the sharp (#). It elevates the pitch by one semitone. Then, the flat (b) does the contrary; it lowers the height by one semitone. Finally, the natural (♮) removes the effects of the other accidentals, returning them to the corresponding note of A Minor. Accidentals are also used in key signatures.

As a contrast to chromatics, diatonic notes are 7; the notes corresponding to the key, which sound more consonant to their counterparts. Many pieces, especially those pertaining to modern popular music, are diatonic with little to no chromaticism.

In conclusion to the prior explanations, melodies are, as a whole, understood to be the combination of time and note intervals. They are the most important part of music; the most involving part that holds most of the listener's attention.

Thirdly, whilst melody follows a horizontal progression or vision where notes proceed each other, the notes' relationship within harmony is simultaneous; vertical. Thus, harmony is the relationship between and study of simultaneous pitches via the chords of greater or lesser complexity that are formed.

Basic chords are triads. They consist of a pitch that acts as the root and two diatonic thirds. The notes used in triads are, counting from the root, the third and fifth. Within these, the nature of the chords, be it Major or Minor, is determined by the interval corresponding to the third. In case of the Major chords, it is of 4 semitones. For minors, of 3 semitones. A strange case naturally occurring in the VII chord of major keys and II chord of minor keys is the diminished triad, formed by a minor third and a tritone or diminished fifth, which is 3 tones away from the root. In their naming, chords are named after their root and nature, the latter of which doesn't need to be specified in major combinations.

New notes can be added to root triads by using more diatonic thirds. Adding a fourth and, then, a fifth, a 7th chord and a 9th chord are prospectively obtained. The process can be continued up to the 11th and 13th and so on. The chord name changes accordingly to its additions. For instance, a D Major chords that contained the third, fifth and seventh would

be called a D7. If a note was to be added omitting the prior thirds, it is to be accompanied by the prefix Add. Following the prior example but changing the 7th for a 9th, it'd be called a DAdd9.

In addition to the prior variations, chords are also altered by virtue of the third. There are two cases, which consist of changing the third for a 2nd (sus2) or a 4th (sus4) note.

Much like notes, chords receive a degree equal to that of the root.

Harmony holds a close relationship with melody, said that every melody can be harmonized, and every melody has a subjacent harmony. Musical pieces nowadays use accompanied melodies that have a principal line cushioned over a harmonic ensemble of lesser importance.

To follow the pace of the melody, series of chords are united in what are called harmonic progressions. They are, in practice, a succession of chords in time. The term that refers to the lapses of time between chords is harmonic rhythm.

The volume and dynamics of thereof are signalized by their own symbols. From quieter to louder: Pianissimo (pp), piano (p), mezzo forte (mf), forte (f), and fortissimo (ff). Progressive increases and decreases are also exist, receiving the names crescendo and diminuendo.

Volume is most commonly measured using decibels (dB). And in digital recordings, decibels full scale (dBFS), a different measure which's maximum value is 0, are used.

It is important to distinguish that the perception of volume is not entirely objective. In practice, in musical pieces, novel, unexpected elements, are perceived as louder. And the perception of dynamics is not always linked to a difference in decibels.

Musical pieces can change their key, tempo, time signature and intensity at any time. Some authors and some styles will do it more and some, less. Jazz is famous for its uses of chromatic tones, modulation⁵... overall harmonic complexity. Dynamics usually vary to strengthen emotional value, and time signature changes momentarily or permanently in many examples like in "strawberry fields" by The Beatles, at the end of the chorus, when it momentarily changes from 4/4 to 3/4. Music is about the processes of tension and distension brought about by the rhythm, the melody, and the harmony, so these changes can hold great emotional value.

3. Musical analysis

Of the elements that make up musical studies, musical analysis is the process by virtue of which it is sought to better understand individual compositions alongside the reason why they sound the way they do, by virtue of deconstructing the different elements that

⁵ Modulation: A change in a piece's key.

constitute them. This requires a basic knowledge, albeit an ampler understanding of the topic should lead to more precise or specific studies.

This is the process that we inspired most of our methodology on, taking some of it and applying it in a general way.

When taking on an analysis on musical pieces, there are a few different things that can be looked into.

We first need to discuss structure, otherwise known as form. Musical pieces are usually divided into musical ideas of differing complexity and importance, of which, amongst others, phrases and sections can be distinguished as two of the most relevant.

Phrases are, in a general sense, self-conclusive melodic sequences that conform melodies and can, as is the most common in contemporary music, form well defined sections. Songs can thus, in similarity to texts, be understood as a succession of phrases that follow a cohesion. These will sometimes use, for example, call and response, a system of antecedent and consequent melodic sequences that interact with each other. At the same time, sections function like paragraphs.

In the process of analysing, structure is understood as the succession of phrases and sections and the repetitions that may occur. Structure is usually expressed using sequences of letters that represent sections and the reiteration of the same. Some common forms are simple (A), binary (AB), or ternary (ABA). In the case of modern music, we usually talk about verse-chorus form, mainly consistent of a verse, a chorus, and a bridge. Its representation normally reads ABABCB, in which “A” is the verse, “B” is the chorus, and “C” is the bridge. Variations of this form may include a pre-chorus or a post-chorus.

Verse — Chorus — Verse — Chorus — Bridge — Chorus
(A) (B) (A) (B) (C) (B)

Figure 5. Basic verse-chorus form. By ourselves

Variations of prior sections are expressed with an apostrophe; for example, a variation of A would be written A’.

Harmony is also studied, mainly in regard to chord progressions. Some points of interest are the chords used, their distance, their effect, and the processes of tension and distension formed by them. When analysing, the chords are noted at the top of the perspective part of the score; their duration noted.

To the end of making chord progressions independent to the key, it is common to talk about chords in respect to their degree. In their written representation, the chord’s nature is expressed via the use of higher (for major) and lower (for minor) case. Diminished use the symbol for ordinal indication; take for an example a diminished second degree, expressed ii°.

On another note, cadencies are an element that makes a great deal in music. They are resting points marked by a harmonic sequence. There are four cadencies marked by the grades used. In the first place there is the authentic cadence (AC), formed by a dominant that resolves to the tonic. In the second place there is the plagal cadence (PC), where the subdominant resolves to the tonic. In the third place, the half cadence (HC) goes from any position to the dominant and doesn't resolve. And the deceptive cadence (DC) builds up stress by moving to a dominant but resolves to a position other than the tonic.

The objective of every harmonic progression is to return to the tonic, thus resolving. And the strongest chord progressions will usually try to resolve in the most conveying way. For this purpose, charts have been formed that represent the strongest sequences.

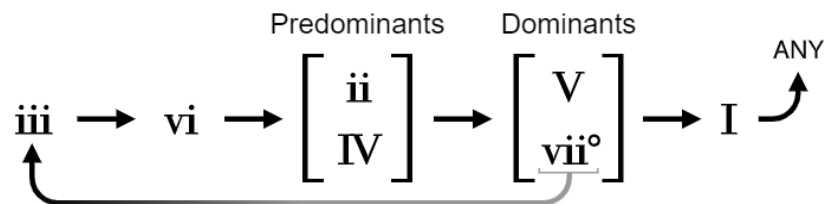


Figure 6. Chord progressions chart of a major scale. Retrieved from musictheory.net. <https://www.musictheory.net/lessons/57>

This chart is formed using the concept of circle progressions, by which the strongest change in chords is moving a 4th. Thus, **iii** is a fourth above **vii°**, which is a 4th above **IV**.

Investigating melody, the scope is broader. Elements to be considered are the use of chord and non-chord tones, the beginning and end, the use of chromatic notes and processes of tension and distension, and ambitus (distance between the highest and lowest tones.).

Melodies get constructed on top of chord tones, notes that hold a harmonic function in distinction to the non-chord tones that connect them. In the case of non-chord tones, factors that are looked into are if the note is diatonic or chromatic, accented (on the beat) or unaccented, metrical (of a duration equal to the beat), sub-metrical (of a duration shorter than the beat) or super-metrical (of a duration longer than the beat). On top, there are distinguished types they can take the form of, which we number in the following chart.

Types of non-harmonic tones	
Type	Explanation
Passing tone (PT)	Approached by a step and followed by a step to a note other than the first chord-tone.
Neighbouring tone (NT)	Approached by a step and followed by returning to the same chord-tone
Anticipation (Ant.)	Approached by a step and followed by the same note.
Escape tone (ET)	Approached by a step and followed by a skip in the opposite direction.
Appoggiatura (App.)	Approached by a skip and followed by a step in the opposite direction.

Suspension (Sus.)	Accentuated tone that repeats the first chord-tone and is followed by a step downward.
Retardation (Sus.)	Accentuated tone that repeats the first chord-tone and is followed by a step upward.
Changing tones (CT)	Approached by a step, followed by a skip in the opposite direction, and finished by a step in the former direction.

We recommend the first lesson on chord progressions in musictheory.net for visual aid.

Another factor of interest is the beginning, which can take three forms: an anacrusis when it starts after the last on-beat of the measure,thetic when it starts on the first beat of the measure, or acephalous when it starts after the first beat of the measure. The end is also of interest. It can be conclusive (ends at the tonic) or suspensive (does not end at the tonic).

Up next, dynamics is the term for sound intensity and its variation. In analysis, the main interest is observing the use of contrasts and its importance within the composition. Although intensity usually refers to volume, it can also be of interest to investigate the changes in perceived intensity.

Not to forget timbre; instrumentation. Instrumentation is not only a medium, but an element of identity and expression. The selection can have a great impact on the emotional effect of a piece, as well as identify the pertinence to a style or genre. In movie scores, heroes tend to come accompanied by brass ensembles, like how strings usually represent love. The glass armonica, a curious instrument hideous for its unsettling timbre, is used in *Lucía de Lammermoor* in the "mad scene". In general terms, more consonant instruments will be used for more consonant pieces, and the other way around.

Instruments are not only identified by their timbre; envelope is also important. A sound's envelope is the variation of its volume in time. For the purpose of understanding and producing, every sound is understood to have four phases: the attack, the decay, the sustain, and the release. These four as spoken of in terms of intervals of time: attack is the time the sound takes to reach an initial peak of volume, decay is the time it takes to go from the peak to a softer, stable volume, and the sustain is the time before the release, when the sound decreases in volume.

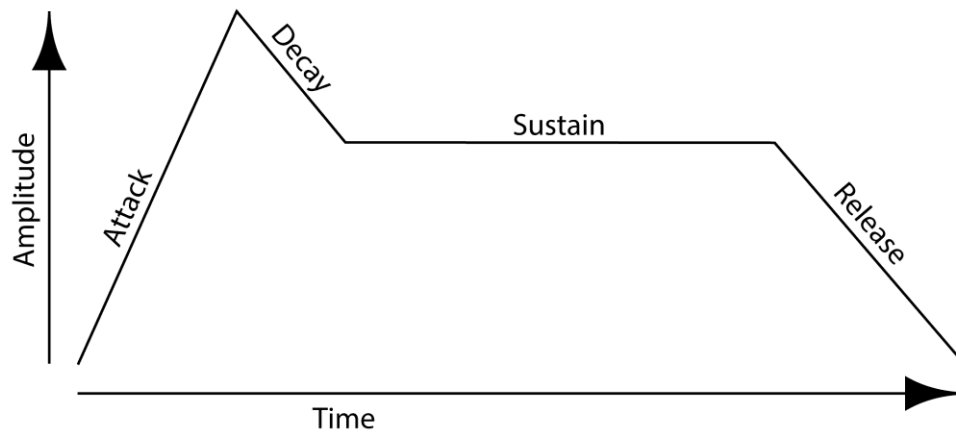


Figure 7. Representation of the phases of the envelope. The vertical axis represents sound volume, and the horizontal represents time. Retrieved from [jythonmusic.me](https://jythonmusic.me/envelope/). <https://jythonmusic.me/envelope/>

Finally, texture is the manner in which melodies interact. Three relevant textures are homophonic, where melodies follow the same rhythm and occur at the same time, contrapuntal, where melodies are independent but make harmonic sense, and accompanied melody, where a main melody tops a harmonic accompaniment.

Of course, analysis does not only include these aspects. The relevancy of each the elements of music within the piece could also be of interest, like in hip hop or Latin pop, sometimes criticized for their predominance of rhythm.

Furthermore, discussing style, genre, and historical context are some of the main parts of musical analysis.

4. The details that define a genre

Genres are and always will be groups of pieces that share a sufficient quantity of qualities. They branch out of styles, similar, but headed into different directions. The factors that can identify a genre are broad, not to discard that anything could be associated to the category. As has already been implied earlier in this paper, recognizing these qualities is more complicated than to recognize the genre itself, as the latter is done subconsciously.

Perhaps one of the most obvious factors is the importance given to each element. Rhythm oriented genres could include variants of Dance or Hip Hop. Harmony oriented, Jazz. Melody oriented, Classical. And lyrically oriented, Folk. Some head towards overall complexity, whilst others prefer simplicity. And some will prioritize the skill of a performer.

Instrumentation is also very representative of genre. Rock usually holds a guitar, bass, voice and drums kits, and strings are nowadays relegated in the mainstream to pop music. Some are more inclined to having greater instrumental complexity or variety in timbre, whilst others rarely diverge from simpler, established ensembles.

In addition, every genre holds its own harmonic, rhythmic, or melodic patterns and formulas. There can be some especially prominent harmonic progressions, intervals, rhythms... The usage of tritones, 9th chords, or the clave⁶ can be examples of this idea.

5. The characteristics of pop music

Pop is most surely a form of contemporary popular music. But it is evidenced that the meaning of “pop” has varied from time and place, diverging in the extend of the music included within. Such is suggested in “pop music technology and creativity”, a book that highlights the appearance that the definition is subjacent to geographical and historical contexts. The genre is, in the same book, defined as a “softer, even more teenage-oriented, sounds that emerged as Rock 'n' Roll waned in the early 1960s”⁷.

Broadly speaking, pop music’s main purpose is to appeal to a large public and thus attain great commercial success. This is a reason for it sometimes being referred to as commercial music. To that end, compositions are distributed in a recorded format.

Pop is, in conclusion, commercially oriented recorded music with the goal of audience appeal. This results in its sound changing significantly through the flow of time due in part to the following of relevant trends.

What today is called pop is the result of a constantly changing sum of its characteristics. Some have been maintained throughout its history whilst others have become wildly different.

A peculiar aspect of its evolution is its non-linear direction. In most genres, compositions are meant to endure the passing of time, having future pieces construct on their ideas and influencing a change over time. In the case of pop, songs have a very limited lifespan. They usually get popular only to be forgotten after leaving the charts. This ensues in compositions having no impact on future generations. Pop still evolves, but the greatest influences in doing so do not originate from within, but from outside, as it takes from popular innovations of other genres. Over the years, the genre has been influenced by swing, rock and roll, reggae, funk, disco and electronic among others; most recently by hip hop. Its objectives incentivise taking from genres that become relevant in the musical scene.

The evolution of pop is, in addition, closely related to technological advances. The genre is peculiarly prompt to taking advantage of technology, be it instruments or effects. Synthesisers and autotune have been very revolutionary and brought on significant changes.

Even thus, pop follows a cyclical pattern in which trends come and go and then return, caused by the genre being prompt to referencing the past, taking inspiration on broader currents once followed in the correspondent time. A recent case is Dua Lipa’s approach to disco, popularized by “don’t start now” in November of 2019, which could have

⁶ Clave: Rhythmic pattern used in Cuban music.

⁷ Timothy Warner. (2003). Pop music technology and creativity, p.3.

influenced the same approach in other hit song such as “Say So” by Doja Cat or “Take My Breath” by The Weeknd.

Even thus, pop has always held its peculiarities that differentiate it as more than a blend of popular genres.

Pop songs use, like most contemporary compositions, an accompanied melody texture. They are short and have a lot of repetition; harmonic progressions usually consist of a short list of chords that switch cyclically every measure. They rely on simple, memorable ideas and diatonic melodies, usually distributed into a verse-chorus song structures, and are accompanied by simplistic arrangements that mainly consist of background chords and synthesizers, commonly followed by a rhythm consisting of a bass drum and a snare drum that does rhythmical setbacks. Pop has a low instrumental variety of which synthesizers and bowed string instruments are especially characteristic.

Their lyrics usually treat love and dancing, and are often self-referential, regularly using the first person. They are simplistic in writing, using a relatively limited language. This is proved by an article from Musixmatch, which observed the data gathered in a study carried out by the same origination. In accordance with the two, in the study that took into account 8 genres of contemporary music, pop placed 7th in vocabulary size, gathering an average of 1188 unique words per the first 10000 of every artist. In the same, the average length summed 312 words per song. This simplistic approach could, as the articles hypothesized, be a factor in the success of the genre.

Broadly speaking, pop is straightforward in the delivery of its ideas, as it aims to quickly catch the attention of the listener. Thus, the chorus rarely appears after more than 30 seconds. Songs pertaining to the genre are intended to be attention catching. Their structures are meant to highlight the memorable parts, and tease at the point of most emotional intensity; "the best part".

Pop songs are conceived with the recording in mind, producing results often impossible outside the studio. In reaction, live performances sometimes use playback. There is a focus on technology over musicianship, meaning artists will often opt to correct lines or use digital alternatives.

Pop music commonly encourages dancing, which requires tempo and time signature to be steady and non-changing.

Pop songs are designed to sound familiar. They all share a lot of, differentiating themselves a by few differing factors, from special chords to unique rhythmic patterns or productions. The appeal of the genre is based on the recognition of its elements. Pop opts to maintain homogeneity over complexity, thus raising songs' immediate likeability, but also reducing their lifespan.

Pop music has always held a very present spot in the top charts. It is currently the most played genre in radio station and second only to Hip Hop on Spotify. But contrary to its popularity, the genre is often criticised for being overly simplistic, repetitive, and of a sort-lived nature, as well as how easy it is to perform. In turn, it appears that pop music, despite appealing to a large public of non-professional listeners, doesn't tend to interest

professionals. This can be noted in the apparent lack of specific professional information on the subject.

To sum up, pop is a commercial genre of popular sung music marked by its changing aesthetic, overall simplicity and shallow variety of themes and ideas both within and outside singular songs, and whose appeal lies within the familiarity of its elements.

6. Is music getting worse?

It is often argued that today's music is worse than that written some decades back, criticizing it for being simple and loud. But leaving aside the possible truthfulness of the idea, what truth could hide behind that statement?

In accordance with composer Arnold Schönberg, the enjoyment of music is linked to a struggle between a demand of novelty and a demand of familiarity. This can be represented via the use of the Wundt curve, which represents likeability in factor of complexity and exposure.

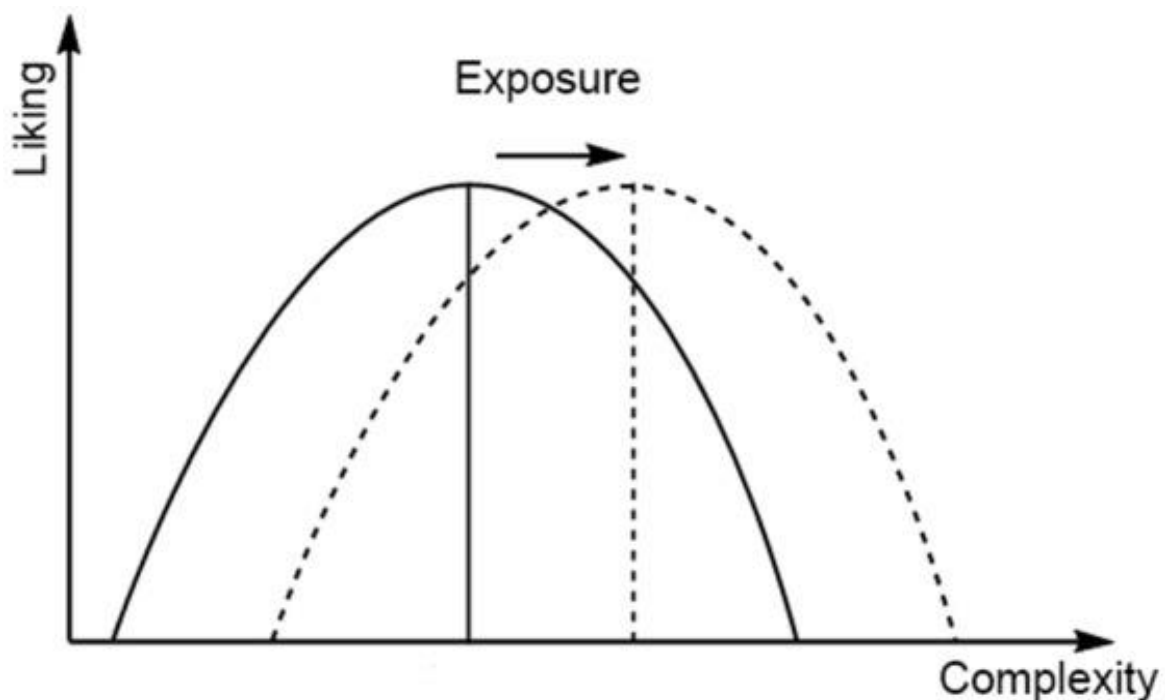


Figure 8. Wundt Curve. Retrieved from "Repeated Listening Increases the Liking for Music Regardless of Its Complexity: Implications for the Appreciation and Aesthetics of Music"

Musical pieces attempt to fall somewhere near the top of the curve. Songs will be liked if they fall in this marked threshold and die out as the exposure to the singular piece makes it boring. This is preferable before novelty and complexity, which receives a longer lifespan, but leads to a lower initial reception, although there is evidence that both should get the same commercial success.

Exposure is the single most important factor to the liking of this art. Falling short results boring, and going too high, repulsive. This system could explain the unpopular state of classical music, or the older generations' especially profound disliking of this decade's music. Though that is not to deny that some present-day tendencies point towards a different approach that could be deemed objectionable; that of economics.

From a financial standpoint, songs are products that need to fit the market. As such, they follow a process of production that has always been long and expensive, requiring knowledge and equipment not available to the common folk. Discographies are the corporations in charge of funding and distributing music. But the current state of the musical industry does not allow them to take risks, at which circumstance they are inclined towards using generic music to increase and secure profits, whilst maintaining greater production and public exposition to a lesser cost per unit. In this manner, it is possible to secure and increased profits at the assumption of being able to maintain the production of new pieces at a low price.

On the same line of thought, hit songs become great financial successes. Take Harry style's "As It Was", which at the time of this study has spent months in the top 20 most popular songs. Although it would be ideal to discographies for every song to be one, the idea is unachievable. Although a company named Polyphonic HMI developed a means of determining the "hit potential" of a piece through hit song science, this technique is not applicable until late production stages. What is instead done to ensure beginning on a good path is looking at what is listed to in the market. Through the analysis of the kinds of songs and productions that are popular among a target audience, they get an image of what is most likely going to work.

But even thus, several compositions start from safer routes. Some opt to write songs that are similar to other successful ones; sometimes bordering plagiarism. In this manner, when new "hits" see the light, they are often followed by a collection of copycat productions of similar melody, harmony, instruments... Another often-used practice is the use of the inspiration triangle, a technique by which elements from three or more pieces are integrated into a composition. This is intended to appeal to the listeners who listen to said pieces, broadening the base of listeners. Though one of its drawbacks is that doing so taking too many elements can prove messy in the result.

Due to all these factors, contemporary, commercially oriented compositions struggle to sound unique.

Additionally, a song's financial success is largely reliant on social factors. Making it so image and marketing have become very important. Due to advertisement purposes, it is compulsory to fit into a genre and to not deviate excessively from the guidelines marked by it, especially in the first seconds, as any piece that does otherwise is to be set aside. Many listeners only care about genre and, most importantly, the ones they think they should like. This decision is strongly influenced by culture, character, and overall identity, making it crucial to muster people the music they are going to appreciate. Young people are particularly prompt to listening to the music their social group likes and to support new artists, thus creating strong waves that support particular individuals. These behaviours and cycles are the reason teenagers make up one of the largest markets. In a way, music is similar to fashion.

Today, an artist's image is especially important, as is its campaign. Photos and videos take prime relevance; sometimes more than the songs themselves. For much of the XX century, radio and television were two of the most important mediums to introduce, or advertise, new productions. Videoclips became a standard and today most big artists have some. In the present day, music could have been affected by musical broadcasting.

Throughout years of competition, loudness has been thought to be correlated with the financial success of songs. As a result, there has been an urge to sound louder than the last song, leading to a gradual increase in said value at the cost of sound quality and dynamic variety. In the present it is common for productions to, after the mastering process, constantly border 0 in dBFS and having little contrast between average volume and peak volume, thus losing emotional value and sound quality.

More recently, popular music has adapted to a global decrease in attention span by lowering its duration. Songs now are well over a minute shorter than years back, ranging from 2 minutes to an occasional 4 minutes.

Yet, the current low of complexity is not only caused by the musical market. It is possible that genres tend to get simpler as their popularity rises. This is given to the fact a piece's complexity depends on demand, specialization, and resources. For instance, it is evidenced that the instrumental variety of a genre evolves in time in relation to its demand. And so those that seek homogeneity grow towards a lesser number of unique instruments.

Complexity is determined, more than anything, by the people behind it. There has been speculation that larger bases of composers produce in turn simpler instrumental arrangements by factor of the skills needed to play or properly compose for an instrument, which are scarce. So as there are more artists, it is proportionally rarer for them to possess the assets or abilities needed to utilize lesser-known instruments.

Increases in sales are usually linked to increases in uniformity, which can be interpreted as music becoming increasingly formulaic in terms of instrumentation under a tendency to popularize music styles with low variety and by extension musicians with similar skills.

We recommend reading "From demo to delivery: the process of production", which centres on the process of production of a song and talks in some parts about the current state of the market.

7. The demo

The demo (or demonstration session) is one of the steps of a production process whose parts can be consulted in the next image.

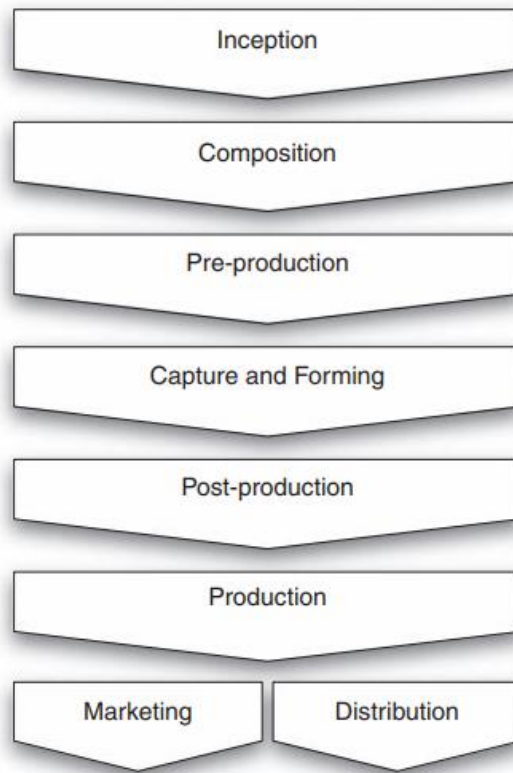


Figure 9. Production process. Retrieved from "From demo to delivery: the process of production"

It consists of the sub-standard recording of a piece and takes part during the pre-production stage as a manner of gaining the interest of sound producers and engineers, or better know the composition to better develop it before the expensive capture and forming stage. However, the demo is nowadays generally obsolete at the relative affordability of home studios that can produce correct audio quality.

Yet, the demo is still used by smaller artist or bands, serving them for refining purposes, but also as a sort of business card.

Practical section

Here, based on our definition of “generic” songs, we conduct an analysis of pop music as a genre to find the elements that a composition of this characteristic should have.

1. Approach

In this practice, we took on a majorly empirical study on pop music. Our analysis of the genre is subjected to the apparition of designated elements within a list of songs, from which we could calculate the relevance of elements or distinguish patterns. We wanted to be definite in our results, often attempting to resemble statistics in our methodology. Here, we made use of the knowledge previously discussed, from which we could obtain some approximations of the truth. We took for granted, for the sake of our methodology’s potential success, that music follows clear tendencies, and that pop tends to be simplistic by design.

It is to be said that said characteristics do not entirely support numerical standpoints, as music still maintains hard to number. It is for this reason that melody, rhythm, and lyrics were treated separately.

On our first approach, we wanted to do a thorough statistical analysis of a great deal of different parameters. Our intention was to divide the study into various parts, of which some would be taken on in parallel, analysing elements from tempo to real time instrumentation. However, after the very first session, we found out the method was inviable in terms of time and methodology, the latter mainly due to the difficulty of differentiating the sections in a way that would permit the study. In the duration of this attempt, we only had time to treat a single song: “About Damn Time”, by Lizzo.

Consequently, on the second and definitive attempt at the study, the only elements approached statistically were theme, tempo, duration, instrumentation, dynamics, and structure, of which some were looked at from slightly different perspectives. At the same time, we prioritized speed in our methodology.

Our study was divided into four phases that treated different aspects of the investigation and composition:

1. **General studies:** This phase includes the analysis of the most general aspects of the selection of songs, those being theme, tempo, duration, key, instrumentation, and structure. These cover the aspects that concern the whole song. This is meant to give an amount of information on tendencies and guide the next phase.
2. **Section by section deconstruction:** Based on the structure that shows to be the most relevant, this phase consists of a section-by-section analysis of determined aspects. This is in some cases done using a system of hypotheses that are validated or invalidated before looking into the next section.
3. **Melody, Lyrics, and use of Instruments:** This phase contains the analysis of the aspects that cannot be realistically defined via the use of statistics, but via pattern finding. This includes any tropes that could be found in the lyrics and main and accompanying melodies. It also includes an overview of singing technique.

4. Composition of a generic song: This last phase consists of the composition of a song that concludes the results of the conducted analysis of pop Music.

We used an Excel document to compile the information acquired from the former two phases to statistically define the relevance of each aspect we investigated.

The proceedings will be further explained in their respective sections in this document.

Knowing that pop songs are mostly the same, conducting a broad analysis should make differences unimportant in comparison to the overwhelming repetition of the genre's concurrent elements. In conclusion, by conducting this methodology on a sufficient sample, on the assumption that we are correct on our suppositions, we should be able to find the aspects that define pop music and, in extension, write a generic song of the style.

This project is marked by the workload of analysing a great quantity of songs, which makes the collection of any kind of information on these an arduous process that rarely took less than an hour to finish, sometimes lasting up to various days of work. This obliged us to take little time on individual songs and to explore ways of speeding up processes. We are aware that some quantity of error is present in the information collected during the first two phases because of these time restraints.

In addition, albeit our selection of pop songs is in no way small, the quantity of subjects is not enough for the results to be exact. We lack the knowledge needed to ascertain the probability of our results not reflecting the reality, but we know that it is a possibility. As such, our results should not be treated as absolute truths, and instead as a possible reality.

2. What do we expect?

We expect the resulting song to, first, reflect the general characteristics of pop music talked about in the theoretical section. Consequently, it should be short, narrowing the three-minute mark. Its accompaniment should consist of a quantity of synthesizers and possibly string ensembles of no melodic purpose, and of syncopated drums. We expect the main melody to be simple but catchy, and for there to be a significant amount of repetition. And finally, for dynamic range to be narrow.

In addition, we expect from experience to find a prevalence of bass guitars and a disuse of guitars. And a very uniform, slightly nasal approach to vocal technique.

As for structure, we think we will find pop to have a verse-chorus form with the addition of a pre-chorus and of a bridge. We suspect songs will show to have short introductions and no outros.

As for lyrical aspects, we believe songs will treat either love or break ups. We think metrics will be maintained somewhat stable, but expect to find some leeway, and think that the chorus will consist of repeating a single sentence.

3. Our selection of songs

Our selection of pop songs was at first going to come directly from the “Today’s Top Hits” Spotify list, the most followed of the genre, which would be consulted from a newly made account. However, this list had an overwhelming number of songs that would fit better into hip hop or dance, thus making this source unviable. In addition, most pop lists that the platform presented us pertained to Latin pop; an equally popular genre, but not the one we were after. In the end we stumbled into “International Pop 2022”, from which we got around 80 songs. Then we used recent YouTube pop Song compilations, which we link in the list below, to reach around 140 songs.

List of YouTube videos used	
1	https://www.youtube.com/watch?v=FErnF9gI1kU&
2	https://www.youtube.com/watch?v=PuJQhtg1VCM
3	https://www.youtube.com/watch?v=jBP4_WliWIg&
4	https://www.youtube.com/watch?v=qfggqUKQVCw&
5	https://www.youtube.com/watch?v=kckN7_vk_F8&
6	https://www.youtube.com/watch?v=FbQB2TvRe0A&
7	https://www.youtube.com/watch?v=sIJfYix8RUI&

Despite our efforts, this selection still contained compositions from anywhere in the decade and of different genres. This obliged us to first delete pieces that very clearly did not fit the genre and then filter the selection by year. We chose to allow only production starting from 2019, date in which, as we concluded after much consideration, pop began to adopt today’s peculiarities. We considered this as that was the year pop started to adopt disco, which’s influences are notable on “About Damn Time” and “As It Was”, two hits of the month of the selection. During this year, pop also seemed to deviate from Dance music, which had had a huge influence.

We list below the final selection of 74 pop songs.

Song	Artist	Everything I wanted	Billie Eilish
10,000 hours	Justin Bieber & Dan + Shay	Falling	Harry Styles
34+35	Ariana Grande	Ghost	Justin Bieber
7 rings	Ariana Granda	Glimpse of us	Joji
Abcdefu	Gayle	Good 4 u	Olivia Rodrigo
about damn time	Lizzo	Heat waves	Glass Animals
Adore you	Harry Styles	High Hopes	Panic! At the Disco
As it was	Harry Styles	Hold my hand	Lady Gaga
Bad guy	Billy Eilish	Holy	Justin Bieber ft. Chance The Rapper
Bad habits	Ed Sheeran	How do you sleep	Sam Smith
Bam bam	Camila Cabella ft. Ed Sheran	I aint worried	One Republic
Before you go	Lewis Capaldi	I don't care	Ed Sheeran & Justin Bieber
Blinding lights	The Weeknd	i like you	Post Malone ft. Doja Cat
Boyfriend	Dova Cameron	In the stars	Benson Boone
Break my soul	Beyoncé	Juice	Lizzo
Build a bitch	Bella Poarch	Kings & Queens	Ava Max
Déjà vu	Olivia Rodrigo	Kiss me more	Doja Cat
Don't be shy	Tiësto & Karol G	Late night talking	Harry Styles
Don't go yet	Camila Cabello	Left and right	Charlie Puth ft. BTS
Don't start now	Dua Lipa	Levitating	Dua Lipa ft. DaBaby
Drivers license	Olivia Rodrigo	Life goes on	Oliver tree

Light Switch	Charlie Puth
Lonely	Justin Bieber & Benny Blanco
Love again	Dua Lipa
Lovely	Billy Eilish ft. Khalid
Memories	Maroon 5
Middle of the night	Elley Duché
Montero (call me by your name)	Lil Nas X
My universe	Coldplay & BTS
Need to know	Doja Cat
Numb	Marshmello
On my way	Alan Walker, Sabrina Carpenter & Furruko
Peaches	Justin Bieber
Positions	Ariana Grande
Potion	Calvin Harris ft. Dua Lipa & Young Thug
Save your tears	The Weeknd
Say so	Doja Cat

Señorita	Shawn Mendes & Camila Cabello
Shallow	Lady Gaga & Bradley Cooper
She's all I wanna be	Tate McRae
Shivers	Ed Sheeran
Snap	Rosa Linn
So am I	Ava Max
Someone you loved	Lewis Capaldi
Stay	The Kid Laroi ft. Justin Bieber
Sunroof	Nicky Youre
Sweetest pie	Megan Thee Stallion
Take my breath	The Weeknd
Thats what I want	Lil Nas X
Thousand miles	The Kid Laroi
Until I found you	Stephen Sanchez
Walk me home	P!nk
Watermelon Sugar	Harry Styles
Wonder	Shaun Mendes

Finally, we compiled these songs into a YouTube list for easy, cheap, and legal access. This was aimed towards saving time in changing songs during the study.

4. First phase: General studies

We started by taking the songs and writing them down an Excel sheet. Next to them, we extended this table to include duration, tempo, theme, key (divided into mode and height), and later on, number of unique harmonic progressions.

First, we investigated duration and tempo, which we did simultaneously. Using the YouTube list, we listed the duration market in the video and, using the tap function⁸ of a digital metronome, we found the BPM. Having done this, we looked into each song's theme by reading the lyrics. We were sometimes aided in this process using web pages that discussed the meaning to contrast our opinions.

We then noted, in a different sheet, the unique chord progressions that appeared in the songs accompanied by the number of apparitions of each. We took the progressions from www.tabs.ultimate-guitar.com and www.cifraclub.com, both sites dedicated to compiling the chords of popular songs for the use of musicians. We wrote the progressions using roman numerals, as is standard. And aiming towards facilitating the apparition of repetitions, we opted to elude alterations such as 7th and 9th chords. We also did not count punctual variations on chord progressions. During this process, we also counted harmonic rhythm and filled the other sheet's remaining columns: mode, height, and number of harmonic progressions. The first half of the later was done separately at the end since we did not think about creating said table until we were a few songs in.

⁸ Tap function: Most digital metronomes have a function that automatically detects the tempo that is tapped.

After this not so simple part, having created a third sheet, we listened to every song again in search of noting their instruments. Some of these instruments were grouped. This is mainly the case of brass and bowed strings, as they often go together. These were later rated by relevancy. We were especially troubled by synthesizers at first, as although it is a single instrument, its sonority can vary drastically. Thus, we decided to, based on function and sonority, distinguish the 6 categories showcased in the table below. We also numbered instrumental variety.

Class	We define it as...
Environmental	A soft timbre of with a long sustain. It is reserved to playing background notes. It is similar to string ensembles or organs.
Soft environmental	A softer, airy, less intrusive version of environmental synthesizers. It is easy to overlook.
Lead	A timbre that usually has a long sustain and a short attack. It holds a melodic purpose, usually playing catchy lines.
Percussive	A collection of timbres of percussive envelopes. It normally has melodic purposes but can also be a background instrument.
Reverberated perc	A collection of percussive synthesizers that have had a delay and a reverberation effect added. It holds more harmonic purposes.
Bass	A collection of timbres that imitate or otherwise substitute a bass guitar.

Importantly, we counted the overlapping of the same instrument as a single instrument. For example, if two guitars played at the same time, we would only count one instrument. It is also relevant to say we distinguished accompanying vocals and percussion instruments outside of drums.

	A	B
1	PercRev Synth	5
2	Drums	
3	Bass	
4	SoftEnvironmental Synth	
5	Piano	
6	Bass	7
7	Guitar	
8	Drums	
9	Piano	
10	Chorus	
11	Perc Synth	
12	Bells/Tambourine	
13		
14	Guitar	4

Figure 10. Screenshot of the Excel sheet. The left column collects the instruments, whilst the right column, the number of them. Changes in colour signalize change of song. By me.

Finally, we created in a fourth sheet a list of the songs' structures. For that purpose, we used an alteration of the standard representation of structure with the difference of using terms from verse-chorus forms instead of letters to make generalizing the results easier. In addition, structure was analysed in a less specific way, representing every verse in the same manner independently of presenting new ideas. In this manner we represented every section that could be considered a verse with "V", every chorus with "Ch", and so on. Here we found the problem of having to distinguish the repetition of verses. Since many verses had an important amount of repetition, it was most often impossible to distinguish when a repetition was actually meant to be part of the same section, which was troublesome as we needed consistency. We didn't solve this until the next phase of the

research, and instead made this part relatively subjectively. Nonetheless, this was unintentionally tackled in an attempt to make repetitions easier to spot. We made a copy of the table that contained the structures, in which we eliminated all consequent repetitions of a section. In this process we also separated the information of having intros and outros.

Original	Copy
In,Ch,Ch,V,V,Ch,V,V,Ch,Ch,Br,Ch,Ch,Ch,Out	Ch,V,Ch,V,Ch,Br,Ch

5.1. Results

In reference to the first sheet, we can extract a variety of important information. Songs that talk about relationships are, as we suspected, a majority. Of the 74 songs, 25 are about love, 21 are about breaking up, and 9 are about sexual intercourse. These three make up 74% of cases.

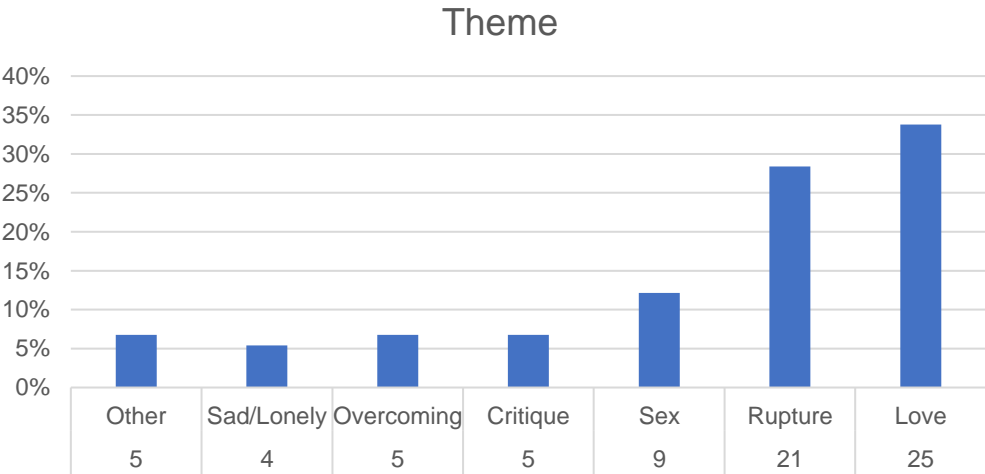


Figure 11. Number of times every theme appears in our selection.

On a different topic, duration fluctuates in values between 2 and 4 minutes, averaging a duration of 3:11 minutes. And Tempo is broad, but a peak can be observed that marks 90BPM as the most important. Note that tempo has been rounded to a factor of 5.

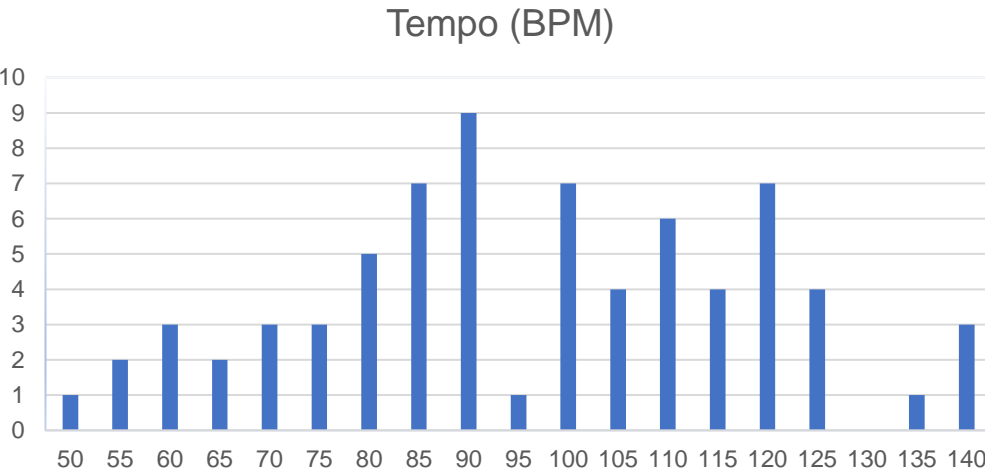


Figure 12. Number of times every tempo appears in our selection.

90BPM is the most used tempo, but values above are still very common up to 125BPM, especially 100BPM, 110BPM and 120BPM. Tempo seems to rarely go above except for 140BPM, value that musters a slight peak.

And as for key, it is mainly non-conclusive. Mode is divided very closely between major and minor, although there seems to be a slight bias towards the major mode. However, this difference could be attributed to statistical error. Height does muster some tones that are more and less common, but we do not find any important prominence.

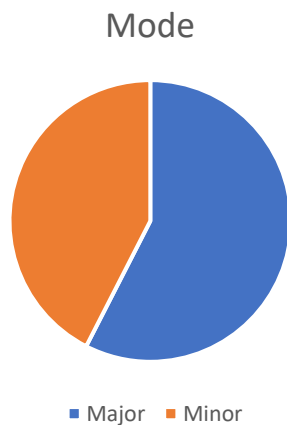


Figure 14. Frequency of major and minor modes

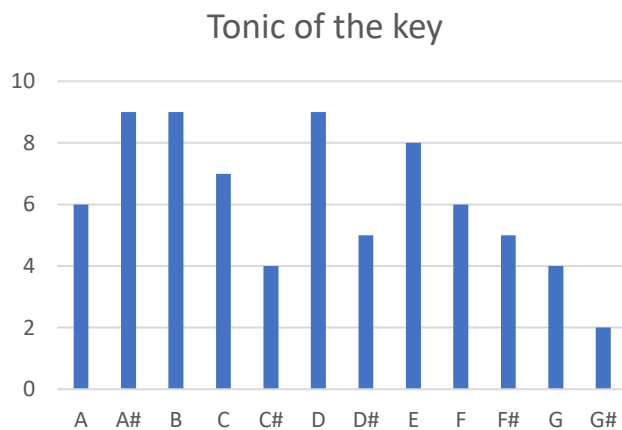


Figure 13. Number of times every height is used

There is less unity than we were expecting in harmonic progressions. We found a total of 77 unique progressions between a total of 104 progressions, summing 27 repetitions. This makes it so, according to this information, a given chord progression has a probability of 25,96% of appearing in another song of the list. Up next is a list of the chord progressions that are repeated 3 times or more

Harmonic rhythm is of 4 beats, the equivalent of a measure, in 41 songs. And 48 songs have only one harmonic progression.

We found a discrepancy that was likely caused by filling the first half of the number of progressions table separately. This table shows a total of 112 progressions, higher than 104 from the specialized sheet. This could insinuate that we made a different judgment on our criteria or forgot to add or count some harmonic progressions.

Moving towards instrumentation, figure 15 shows the instrumental variety of pop songs in reference to number of unique instruments, and the number of compositions that have the respective quantities, showing a tendency towards 5 and 7 instruments.

Chord Progression	Appearances
i,VII	3
ii,V,I,vi	4
i,VI,iv,V	4
vi,IV,I,V	4
i,iv,VII,III	3
I,V,vi,IV	4
IV,I,V,vi	3

Moreover, counting the apparitions of instruments shows a relatively short list in which some clearly appear in most songs. The results of the instrumental complexity graph can be applied to the instruments to distinguish which could be the most common arrangement. Thus, we mark in dark yellow the 5 most common, and in a lighter yellow the next 2, adding up to 7.

Apparitions	Instrument
66	Drum kit
45	Guitar
41	Vocal accompaniment
41	Bass
38	SoftEnvironmental Synth
28	Piano
20	Strings
21	Environmental Synth
20	Bass Synth
19	Lead Synth
16	Corporal percussion
14	Perc Synth
9	PercRev Synth
8	Bells/Tambourine
5	Shaker
5	Brass
4	Sampled vocals
2	Whistles
2	Cuban percussion
2	Vibraphone
1	Metronome
1	Harp
1	Flute

Instrumental variety in pop songs

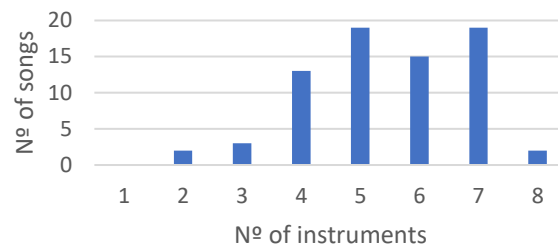


Figure 15. Number of apparitions of each quantity of unique instruments in our selection.

In our curiosity, we made a copy of figure 15's graph without counting accompanying vocals. The result has a rounder shape, which could muster that compositions are more likely to include them the more complex they are. Some time later we did the same to percussion, which had no effects on the shape.

nº Instruments with unified percussion and no accompanying vocals

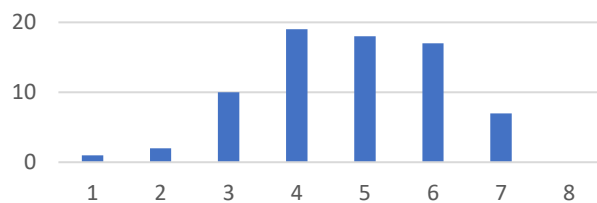


Figure 16. Alternative version of figure 15 that does not count vocal accompaniments and percussion instruments other than drum kits.

Finally, the most common song structure was “V,PCh,Ch,V,PCh,Ch,Br,Ch”, as it is written on the sheet, repeating 15 times. This structure should also include an intro and outro, as they appear in

80,8% and 58,9% of songs respectively. This was also to our surprise, as we had initially thought structure would be the most cohesive element of the selection. Thus, we take that in the second phase of our study, we will have to study this structure.

4.2. Problems and obstacles

During the practice of this study, we have encountered a lot of difficulties and made many mistakes, which we intent to discuss before concluding. But this first phase was when we faced most of them. The origin of most was the YouTube list that we had created, which contained a lot of non-licenced musical videos from creating it hurriedly and wanting to evade videoclips. Due to later sorting the list in Excel alphabetically, both lists of songs did not have the same order, so when listed videos became unavailable in YouTube, most likely because of being taken down by copyright owners, we had no exact way of discovering missing songs and their original positions. This was problematic on its own as it was time consuming to look for the missing song, but this also hurt the reliability of the information. All this phase's sheets outside of the original followed the YouTube list's order, so whenever this happened, we became unable to correct possible mistakes. In addition, we found near the end of the phase that a rejected song had failed to be deleted. In conclusion, this caused us to lose important days of work and have a small error be present in the data.

We fixed this problem near the beginning of the second phase by creating a new list of licenced videos that follows alphabetical order.

5. Second phase: Section by section deconstruction

This phase was yet again done in separated sheets for better ordering and accessibility, one per section and an additional one for general aspects that we had not considered in the first part.

At the beginning, we had established a methodology based on the use of hypotheticals. We would first think of suppositions in form of questions that we would then be able to verify by responding them in every song. After some time, we moved to more established questions, as can be seen in this phase's results.

One or two?		
List	Answer	Repetition
1	1	0,25
2	2	0,75
2		
2		

Figure 17. Example of our model. "List" contains the answers, and the two darkened columns count them

Even thus, from the very beginning we had possession of a list of subjects that needed to be treated in every section as to not forget them. These were duration, internal structure, and instrumentation. Two more existed at first, but they were quickly gotten rid of in the general analysis of this phase.

As for repeated sections, we would see if they were the same as their first reiteration. And in the case the answer was negative, we noted the differences at the side.

Although verses received a different treatment. All of this phase's tables rely on the "COUNT.IF" and "COUNTA" excel functions, which respectively count the number of cells that fulfil a requisite and that are filled.

Same?			Reason	
List	Answer	Repetition		
Yes	Yes	0,75		0
Yes	No	0,25		0
No			Difference	1
Yes				0

Figure 18. Example of our second model. the numbers at the right count the reiterations of the differences.

Before heading on to the results, we need to explain how dynamics, internal structure, and instrumentation were tackled.

5.1. Dynamics

We tackled dynamics in two different ways. The first: By recording the stereo mix of the computer on audacity whilst playing a song from the YouTube list and skipping the video at intervals of 10 seconds, we were able to obtain a short audio that reflected to change in sound volume in every instance. Then, by setting the unit of measure of the graphic aid to decibels, we could easily distinguish changes of volume.

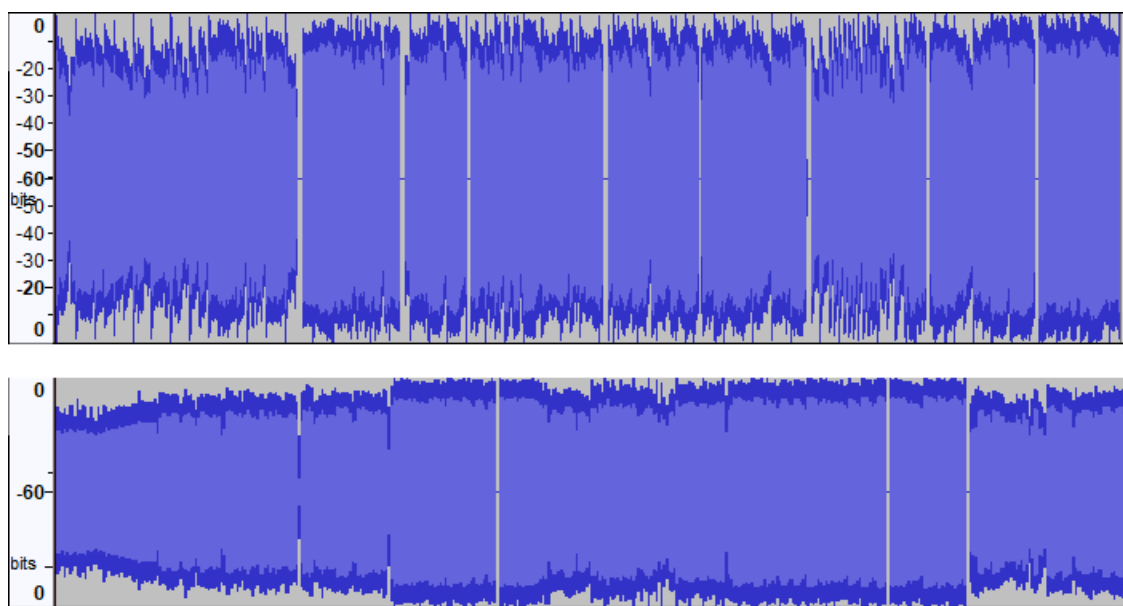


Figure 19. Difference between a song with Dynamics (below) and one without (Above). It can be spotted if there is dynamic variation by drawing a straight line parallel to the superior and inferior margins.

The other way centered on perceived intensity. We inspected whether the section in question was, in relation to the prior section, perceived louder, quieter, or equally loud. At the glimpse of any doubt, we would consider it of equal intensity. This method was reserved to the chorus and the bridge.

5.2. Internal structure

As we have previously explained, analysing structure is problematic. So based on what was done during the first phase of the study, we treated everything that could be called of a kind of section (Verse, Chorus, bridge...) as a single unit, this being what we called the section in this phase.

For every sheet, we counted the duration of the section in measures and, following that, wrote down the internal structure, something we invented for the sake of the study.

We understand internal structure as the biggest pattern in the presentation of ideas. We expressed them using letters. Using this method, we were able to neatly define the section without having to delve into problematics.

5.3. Instrumentation

Whilst at the beginning we were only investigating change in the number of instruments playing, towards the end, we decided it would be more worthwhile to repeat its analysis in another more informative manner.

Nº instruments								
List	Answer	Repetition						
4	1	0,054054	Guitar	Bass	Drums	SoftEnv		.
4	2	0,108108	Strings		Drums	Bass		Acc
3	3	0,27027	Perc	Env	Drums			cont
6	4	0,351351	Bass	Drums	Perc			Acc
5	5	0,175676	Guitar strum	Drums	EGuitar Mute	Guitar	Bass	env
4	6	0,040541	Bass	Drums	Piano	Guitar Funk	Perc	Acc
			Bass	Drums	Guitar funk	SoftEnv		cont

Figure 20. Example of the model. Instruments are written down onto the grey cells, and a function in the "list" column counts the number of instruments. Vocal accompaniment is put at the right side of the table.

We went on to write down every song's instrumentation in every section, this time without counting accompanying vocals nor percussion outside of drum kits and considering doubling of instruments. For example, if two pianos were to play at the same time, we would write piano two times. It is relevant to point out that, this time, guitars and vocal accompaniments were categorized into types by their usage.

Then we counted the number of apparitions of each instrument and divided it by the number of elements in the table of instruments to acquire a percentage.

By the nature of this information, we will only be able to present the most relevant instruments in the following results.

5.4. General sheet results

We wanted to know how common riffs were, and if dynamics were stable as a guide to the actual sheets.

Question	Yes	No
Has a riff?	0,472973	0,527027

The results are mostly inconclusive, but given the range of things we counted as a riff, we would rather say they do not.

Question	Yes	No
Stable voice dynamics?	0,694444	0,305556

The results show leading voices to have dynamic variation.

Question	Yes	No
Stable dynamics?	0,625	0,375

In contrast to singing voices, songs as a whole do not tend to have dynamic variations.

Question	5	10	15	20
Difference of volume (dBFS)?	60%	30%	5%	5%

Unsurprisingly knowing the previous results, those songs that have dynamic variation tend to do so by 5dBFS, and otherwise by 10dBFS.

In collecting information on dynamics, we did not count the volume of the introduction, as we noticed it was often softer than the rest. We instead reserved it to the verse sheet.

5.5. Intro sheet results

Question	2	4	8
Duration	14,52%	50%	20,97%

The most common is for intros to last 4 measures, which is the case half the times.

Question	Yes	No
Do instruments enter in order?	33,33%	66,67%

Although there are cases where the instrumentation is not the same at the beginning and at the end of the section, it is not the norm happening only a third of the times.

Question	Yes	No
Is it some version of the next section's accompaniment?	0,672131	0,327869

The percentages show that the most common is for the introduction to be some version of the accompaniment of the section that follows.

Question	Yes	No
Are all instruments in the next section's accompaniment?	0,560976	0,439024

Of the introductions that use the next section's accompaniment, only half use the exact same instrumentation.

Question	Yes	No
Is there a dynamic variation within the section?	0,111111	0,888889

The results show a clear "no". Although 11,11% is not a small quantity, it is far from being the most common.

Instruments' apparitions in the section						
Drum kit	SoftEnv	Env	Bass	Piano	Guitar Strum	Guitar
18	12	6	11	16	4	17
29%	19%	10%	18%	26%	6%	27%

Number of instruments					
1	2	3	4	5	6
50%	25,81%	17,74%	6,45%	0%	0%

The most common instruments are the drum kit, the guitar, and the piano, followed by the bass and environmental synthesizers. There is a predominance of using only instrument, which according to the prior tend to be a piano or a guitar.

5.6. First verse results

We define the first verse as a section that is not an introduction or refrain and appears before any repetition of the chorus. As such, only 55 songs were analysed.

Question	4	8	16
Duration	10,91%	45,45%	32,73%

Question	A	AA	AA'	AB
Internal structure of verses of 8 measures	4,17%	50%	33,33%	8,33

Question	A	AA	AA'	AB
Internal structure of verses of 16 measures	10,53%	52,63%	15,79%	15,79%

From these we can know that pop songs most commonly have verses of 8 measures. Adding those that last 16 measures, we get that these two apply to 78,18% songs. The duration is usually divided into two repetition of a musical idea that is sometimes variated in the reiteration. We can also know that verses that last 4 measures and that last 16 measures have similar internal structures.

Wanting to discern if there was a gradual increase or decrease in instruments, we counted their number at the beginning and end of the section. And in case songs that did not have introductions had a different tendency, we first looked into those that have one, and then took the rest into account separately.

Question	1	2	3	4
Number of instruments at start (Intro)	35,42%	37,5%	25%	2,08%

Question	1	2	3	4
Number of instruments at start (All)	38,18%	34,55%	25,45%	1,82%

Question	1	2	3	4
Number of instruments at the end	21,82%	36,36%	32,73%	9,09%

Although these results are not entirely coincident with latter numbers, there is indeed some quantity of valid information.

On top of telling us that having an introduction does not affect the number of instruments, a subtle increase can be distinguished in the number of instruments, as the concurrence of verses with 1 and 3 instruments seem to swap. Looking further into this we discovered that a 29,09% of verses had this change, of which a 67,27% start with 1 instrument and a 32,73% start with 2. In total, 11 verses have an increase of 1 instrument and, 5 verses, of 2.

Question	Higher	Equal	Lower
Dynamics in relation to Intro	26,53%	69,39%	0%

The data shows that the verse tends to have the same volume as and never is softer than the introduction.

Instruments' apparitions in the section							
Drum kit	SoftEnv	Env	Bass	Piano	Guitar Strum	Guitar	PercSinth
34	14	4	21	15	5	137	8
63%	26%	7%	39%	28%	9%	24%	15%

Number of instruments						
1	2	3	4	5	6	
20,37%	37,04%	27,78%	12,96%	1,85%	0%	

There exists a tendency towards having two instruments. Verses with one and three instruments are also common, as well as those with four. Overall, it can be seen that the frequency gradually decreases as the quantity gets further from two.

In a question before this method, we discovered that guitar and piano rarely play simultaneously, as so does the piano with synthesisers. What does happen more often is having a guitar and a synthesiser at the same time.

Guitar+Piano?	Guitar + Synth	Piano + Synth
2	7	1

Looking further into the data, a pattern can be seen here that extends to the rest of the songs' length. Of the songs that have 3 or more concurrent instruments, most feature a drum kit, a harmony-oriented instrument (usually a synthesizer), and an instrument that interprets more monophonic lines, the likes of bass guitars or guitars. This homogeneity in instrumentation can only be observed in these.

5.7. First pre-chorus results

Question	2	4	8	16
Duration	6,67%	31,11%	57,78%	2,22%

The most common is for it to last 8 measures, followed by those that last 4 measures. This is contrary to the first verse, which held the second place in the higher end.

Question	A	AA	AA'	AB
Internal structure	42,22%	31,11%	13,33%	12,33%

If we add together AA and AA', there is a close tie between A and AA forms. We suspect that most pre-choruses that have a sole idea and no repetition could coincide with those that last 4 measures.

We suspected that pre-choruses could have entirely chord oriented accompaniments, so we made a table on the matter that checked if instrumentals were headed by plain chords.

Question	Yes	No
Is the accompaniment chord-based?	48,89 %	51,11%

Question	Yes	No
Is the accompaniment the same as or a variation from the verse's?	68,89 %	31,11%

Half the pre-choruses have a predominantly harmonic accompaniment, and a majority have a similar accompaniment as the verse. Interestingly, only a 24,44% of pre-choruses fulfil both of the prior, which could be understood as chord-based accompaniments often introducing new accompanying lines.

Instruments' apparitions in the section							
Drum kit	SoftEnv	Env	Bass	Piano	Guitar Strum	Guitar	Strings
36	17	3	24	13	11	8	7
80%	38%	7%	53%	29%	24%	18%	16%

Number of instruments					
1	2	3	4	5	6
13,21%	11,32%	24,53%	32,08%	3,77%	0%

Here, there is a tendency towards having 4 instruments, closely followed by having 3. Most pre-choruses have drum kits and half have bass guitars. Environmental synthesizers are also common, and guitar passes here to strumming.

5.8. First chorus results

We only considered the choruses that appear after the first verse. As such, in songs that present the chorus before the first verse, we decided to ignore the first reiteration and go to the second. Thus, the first chorus is here the first chorus that appears after a verse.

Question	4	8	12	16
Duration	13,51%	51,35%	9,46%	20,27%

The most common is to last 8 measures.

Question	A	AA	AA'
Internal structure	16,22%	37,84%	10,81%

The structures here are the most varied, so we only show those that appear more than 10% of the times. Of these, the most common are AA forms, amounting to 48,65% of cases.

Question	Higher	Equal	Lower
Intensity in relation to Intro	63,51%	20,27%	16,22%

The chorus is most commonly of higher emotional intensity than the previous section.

Instruments' apparitions in the section									
Drum kit	SoftEnv	Env	Bass	Piano	Guitar Strum	Guitar	Guitar Funk	PercSinth	Strings
65	29	11	62	19	13	14	9	14	11
88%	39%	15%	84%	26%	18%	19%	12%	19%	15%

Number of instruments					
1	2	3	4	5	6
5,41%	10,81%	27,03%	35,14%	17,57%	4,05%

The results are very similar to those of the pre-chorus, showing a slightly higher preference to higher instrumental complexities and presenting percussive synthesizers as important timbres. Bass guitars become here as important as drum kits.

5.9. Second verse results

Question	Yes	No	
Does it have the same melody as the first verse?	73,68 %	17,54%	
Question	Yes	No	Comments
Does it have the same duration as the first verse?	73,68 %	21,05%	They tend to be half the original duration when not.
Question	Yes	No	
Does it have the same instruments as the first verse?	64,91%	35,09%	
Question	Yes	No	
Does it have the same accompaniment as the first verse or a variation of the same?	89,47%	10,53%	

The second verse tends to be, overall, the same.

5.10. Second pre-chorus results

59,09% of second pre-choruses are the same as their former reiterations. The most common difference is the addition of instruments.

5.11. Second chorus results

83,33% of second choruses are the same as their former reiterations.

5.12 Bridge results

Question	4	8	16	
Duration	20,75 %	58,49%	7,55%	
Question	A	AA	AA'	AB
Internal structure	15,38%	48,08%	7,69%	9,62%

Like the prior sections, the most common is lasting 8 measures and having an AA structure.

Question	Higher	Equal	Lower
Dynamics in relation to prior section	7,84%	45,1%	45,1%

The bridge shows to rarely be of higher emotional intensity, often being equal or lower in magnitude than the prior. Although the two are tied, knowing the rule implemented by us in the collection of this data, it could be slightly more prone to being of lower intensity.

Instruments' apparitions in the section								
Drum kit	SoftEnv	Env	Bass	Piano	Guitar Strum	Guitar	Strings	PercSinth
49	21	6	40	16	8	9	9	8
96%	41%	12%	78%	31%	16%	18%	18%	15%

Number of instruments					
1	2	3	4	5	6
9,43%	13,21%	30,19%	33,96%	13,21%	0%

Bridges almost always have drum kits and bass guitars, and there is an increase in the use of environmental synthesizers. The number of instruments is very similar to the chorus'. In addition, of 51 bridges that we analysed in total, 46 had vocal lines.

5.13. Third chorus results

We found that, in contrast to the prior repetitions, this last chorus does tend to add some variation. For this one, 63,49% of songs presented differences from duration to instrumentation. The quantity of differences varies in our system from 1 to 2, being the former the most concurrent, and the most recurrent change is the addition of accompanying voices, making up a fourth of the variations found.

5.14. Outro results

Having the results of the prior sections, we calculated the duration this section should have using the average duration in addition to the most common tempo and lengths. We thus converted 3:11 minutes into 191 seconds and multiplied the magnitude to $1,5BPS = 90BPM/60s$ to find that the average song should last 286,5 beats. The prior sections added up to 272 beats, and as such the outro should be equal to $286,5 - 272 = 14,5$ beats, or 3,625 measures, rounded to 4 measures. A realistic duration for an outro.

Question	Conclusive	Suspensive
How does it end?	56,76%	43,24%

We have found no clear preference between conclusive and suspensive endings.

To identify how outros generally are, we distinguished them into 5 categories in factor of them being instrumental or sung and differentiating in the last those that presented new musical ideas or a verse (V), those that played with the chorus like Adore You by Harry Styles does, and those that solely speak a short phrase (we called it "last words" as they are short and end the song). Those that combined the prior were categorized as "other".

Question	Inst.	Ch.	V.	L.Words	Other
Internal structure	44,68%	21,28%	12,77%	10,64%	8,51%

It can be observed in our data that 36,49% of songs do not have outros. By then applying the formula $x = (1 - b) \cdot c$ where b is the percentage of songs that do not have outros in decimal form and c is the frequency of one of the types of outro, also in decimal form, we can find the percentage within our selection of songs. Doing so, it is interesting that even the most common kind of outro, instrumentals, happen to be less frequent by themselves than not having an outro, as it appears in 28,38% of songs.

Instruments' apparitions in the section								
Drum kit	SoftEnv	Env	Bass	Piano	Guitar Strum	Guitar	Strings	PercSinth
29	13	4	24	13	7	5	5	8
71%	32%	10%	59%	32%	17%	12%	12%	20%

Number of instruments					
1	2	3	4	5	6
23,91%	13,04%	28,26%	23,91%	8,7%	0%

The quantity of instruments within a range of 1 to 4 instruments with a low in having 2. The most common instruments are drum kits, bass guitars, piano and environmental and percussive synthesizers.

6. Third phase: Melody, Lyrics, and use of Instruments

Despite this one being the least factual of phases, it is in no way less important. Melodic and lyrical aspects can be of very defining aspects, but hard to properly study. In response, we dedicated some time to attempting to find patterns in both leading and accompanying melodic lines, which we present up next subjected on examples.

6.1. Leading melody

We believe to have found that leading melodies generally consist on the repetition of a short phrase or the succession of similar phrases. Take Harry Style's "As It Was". These usually occupy a single measure (in this case they normally would not be called phrases, as they lack a proper cadence, but these are peculiarly conclusive), although they sometimes go up to 2 measures, and seem to revolve around a single rhythmic pattern, for which the verse of almost any song from our selection can testify. Even thus, we would like to point out Joji's "Glimpse of Us", in which there is a less obvious inflexion on a certain rhythm thorough most of the song. Melodies are generally written in quavers and crotchets, and especially in verses and pre-choruses, rhythms tend to be plain; take the verse from Harry Style's "Adore You". Even so, it is not rare to find the use of semi quavers for passing tones or whole sections: listen to "Levitating", by Dua Lipa. There is also some presence of triplets. The begging to phrases tends to be anacrusic, especially in the chorus. That said, we have no conclusive evidence of this being more prominent than acephalous starts. We are certain that thetic beginnings are the least used.

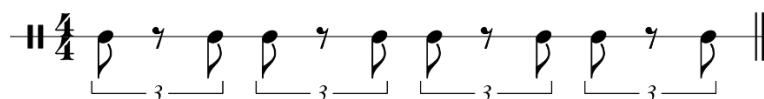


Figure 21. Rhythm that is often insinuated by the leading melody of "Glimpse of Us"

There is, especially in verses, some relevance to repeating the same phrase twice at the beginning. By this we refer to reduced versions of AABA or AABC forms. We must remember Justin Bieber's "Ghost" or Ed Sheeran's "Bad habits", but it can also be found in the chorus to Camila Cabello's "Don't Go Yet" and many others. It is also remarkable that pop songs do not seem to use call and response.

Melodies are made up of little notes; we believe they consist of 2 to 4 different tones, of which only one takes importance. Phrases most often than not revolve around this single tone, accompanied using neighbouring tones. There is also some quantity of scales, especially at the end of phrases and sections. Consequently, the interval we found to be more used were steps. We must remember "Bad Habits" again, as it perfectly demonstrates all the points we discussed.

Melodies are not very directional, but they tend to go downwards, as the small quantity of scales that appear usually go in that direction.

Knowing that pop is a genre of sung melodies, talking about leading melodies involves considering singing technique. The approach is unexpectedly varied but the bases are somewhat consistent. In essence, it consists of a slightly nasal technique that is not prominent in the use of chest voice, contrasting with styles like Hip Hop, which we were expecting to have had more of an influence. Pop singers rarely use vibrato. We believe this is a consequence of the normalization of pitch correction.

6.2. Accompanying instruments

Accompaniments are, as we found previously, formed by few instruments. These rely on looping, meaning they repeat the same line across parts of the song. What is of our upmost interest is knowing what the most relevant instruments tend to perform individually as to understand their sum.

Starting from environmental synths and their softer counterparts, it is already known what they do: plain chords. It is of our belief that they usually play notes that are around the central octave.

Drums usually use only the bass and snare drums, doing the typical syncopated rhythm. It is sometimes accompanied by a high hat that most consistently does quavers, although this is not the norm.

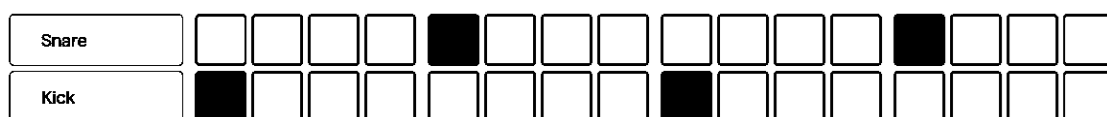


Figure 22. The drum's classic syncopation. By me, using soundtrap.com.

The bass guitar takes on two entirely different types of line. The first, more harmonically oriented kind, consists of playing a sole note in a monotone rhythm, whilst the second acquires a more rhythmic style by using off-beats to play ornaments or anticipate a change of chord. The former seems to be the most used.



Figure 23. Example of the two approaches applied to a Cm-A# chord progression.

When appearing alongside other instruments, the guitar usually does arpeggios or simple two note lines. When it is otherwise strummed, the guitar tends to hit on the beat or, sometimes, follow a common rhythm marked by having two dotted crotchets. Even thus, it's rhythmic patterns can take many other forms. The guitar is, alongside bass guitars and some synthesiser timbres, often the instrument that does the riff when there is one. We believe that guitars are passed through a chorus effect.

Pop music's pianos are very chord centred, and many times that is the only thing that is played on the instrument. When it has importance within the accompaniment, it uses a variety of non-chord tones as to sound interesting. We did not find any circumstances where the lower register is used.

Finally, those accompanying vocals that appear solely in the last chorus are generally contrapuntal to the leading melody. They normally take melodies from previously seen sections or from the chorus itself.

In general, lines performed by the instrumental support appear in some form as an element of the song's chorus.

6.3. Lyrical aspects

A remarkable use of the first and second persons can be found in direct correlation with the personal, informal register used by the genre's writers. Contractions and shortened words are in constant use, either for character or metrics.

Lines widely vary in length both within the genre and the songs. Metrics are rarely maintained stable, as the number of syllables is rather loose. This usually ranges anywhere within a range of 6 to 9 syllables, but it can easily move towards double digits and, yet again, the quantity can vary in the section, mixing in longer and shorter lines. Lines shorter than 6 syllables are generally reserved for choruses, which have the least consistent metric alongside bridges.

The contents vary drastically in relation to the section they pertain to. This is especially relevant for message. Verses tell a varying amount of information important to the song's context, which is usually done in a not-direct manner and may and may not follow a clear cohesion. The pre-chorus mainly leads to the chorus, but usually contains lines that are very relevant to the theme, and the chorus culminates the message. The bridge is many times a reflection on the prior elements.

In the chorus, the lyrics revolve around the title, which normally repeats a few times. Albeit it is undoubtedly common for choruses to consist of a single line, with the example of some recent hit songs like "As It Was", this is many times not the sole content of the section. In said cases, this phrase is instead repeatedly inserted into the lines, take "Good

4 u” by Olivia Rodrigo, or inserted as an important part of the lyrics, take Doja Cat’s “Kiss Me More”. It is not rare to find the phrase opening and closing the chorus. We must remember “10.000 Hours”, by Justin Bieber and Dan + Shay.

It is interesting to find no iterations of the word “love” and, instead, the prevalence of referencing someone’s eyes or not being able to stop thinking about somebody.

We believe that love songs revolve around concrete sentiments or experiences brought about by the topic, as so do songs about break ups.

Pop music's lyrical aspects are of a wide variety and loose in structure, at least in the case of those topics we are qualified to discuss. We do not consider the patterns found here to be very defining, and most have been generalized to the end of defining the genre.

6.4. Other remarkable aspects

Some quantity of songs play a sound at the end of the introduction. It usually does some sort of fade in⁹; we are unsure whether it is tuned. We suspect the timbre to sometimes be that of a cymbal that is preceded by the same but reversed. This can be observed in Tiësto and Karol G’s “Don’t be shy” or The Kid Laroi and Justin Bieber’s “Stay”.

7. Fourth phase: Composition of a generic pop song

This process was deliberately conducted in two separate parts. First, we wrote the lyrics and melodies. Then, we recorded the song. We left the addition of backing instruments to do in parallel to the second, as they depend mainly on our data and we would be using digital instruments that are controlled via the editing software and which’s lines can be easily changed.

7.1. Composition:

We took it as a priority to choose the tempo, key, and chord progression, which were going to be the most restricted elements. In accordance with the prior results, we picked a tempo of 90BPM following the tendency in figure 12 and the ii-V-I-vi chord progression, which is one of the most repeated in our selection. Lastly, knowing that this progression pertains to a major aspect and that the height could easily be changed any time before recording, we temporarily chose the F major key for comfort. After this, we debated whether we should treat an active love or a breakup.

Then we went on to write the lyrics, which we did as we composed the melody. This was done to ease writing the lyrics, which is an aspect we do not excel in. We followed the structure we had found to be the most common in the second phase and started from the chorus as it is the most important part of the song. We started by brainstorming a list of short sentences and words that could be of use in a future. Then, from the ideas we had

⁹ Fade in: Gradual increase of volume from silence.

brainstormed, we chose “take you for a ride” as a hook. This line inspired us to write about a breakup, and we eventually thought up the following chorus.

Maybe let me take you for a ride

Just you and I

And we'd drive all night

And we'd go beyond the stars

And we'd feel infinite

Only now I think of it

I'd say hi

Baby I'll take you for a ride



This chorus, melody included, was inspired by many songs of which we highlight “As it Was” and “10.000 Hours”. But the result also reminds us of “Levitating” from the line that says “baby let me take you for a ride”. The sentence is very similar and follows a similar melodic sequence.

The chorus, highly based on a movie troupe, is intended to be the melancholic memory of someone who has broken up in some instant in the past.

Due to the beginning of this chorus, we decided that the best section to write next would be the pre-chorus as to properly build it up. We struggled especially with finding a melody that would attain to the characteristics we had found it should have, which also happened whilst composing the chorus. Here we took inspiration from the pre-choruses from a plethora of songs. In this case we highlight “abcdefu”, “Adore You”, “Levitating” and “Break My Heart”. We believe the result is somewhat similar to the pre-chorus in Shawn Mendes’ “Wonder” in style.

As I come home tonight

I can't take you off my mind

We'd go

To the end of the world

I miss you by my side

If I could go back in time

I would go

To the days when I'd say



We made sure to use the phrase “I can’t take you off my mind” as a reference to this topic’s relevance in pop music.

We followed with the verses, which we really struggled to attach a melody to. We took great inspiration from “Stay”, “I Don’t Care”, and “As It Was”. We tried to be as indirect as possible in the theme, although we struggled in some parts. As for the lyrics, we referenced many songs to get the lyrics done. Like “Snap”, for the second half of the first verse. The first verse is the following.

*Been drinking on a daily basis
The headache passes down the pain, yeah
Feeling like my clothes weigh me down
But I'm looking front
These people telling me to face it
And I'm nowhere near getting over it
'Cause no one could ever replace ya'
It's just not the same*



The second verse is looser in metrics, and it references in the end the first verse, which we would have preferred not to do.

*Going out is not the same since
Music doesn't have the same tint
And I'm thinking that the strangers know me
From the wrong things
I've been thinking of the things we did then
Now I'm staring at my reflex on a dark screen
Raindrops blind my eyes, and I can only say
It's just not the same*

To finish, we wrote the bridge, which was significantly easier to do than the previous sections. Its melody is based on triplets and it has longer phrases, of 2 measures. We referenced here a line from “Stay”, which should be noticeable in the second line.

I know I didn't do right back then

Maybe I said I could change knowing I could not

Baby I'm sorry for ruining what we were once

If you gave me a chance, if you just gave me a chance



The process of the composition was done with heavy time restrictions, and we do not think we were able to properly encapsulate its characteristics. We believe we relied on one-note melodies too much. Parallely, we think that actual pop songs could do more use of figures of speech than we did, but we are quite pleased by the results, as we believe in our lack of familiarization to the genre that this song does indeed, at the very least, remind of pop music. If anything, we'd have to criticize the melody.

7.2. Recording:

We recorded and edited the song using Reaper, a DAW¹⁰ programme that offers a free, non-limited trial version, as well as some VST plugins, from which some were the instruments used. The accompanying arrangement was treated first. We decided to use a bass guitar, an environmental synthesizer, a drum kit, and a guitar. These were chosen over much consideration and looking at the results from phase two, especially those from the chorus. The resulting selection is very influenced by the pattern found in arrangements of 3 instruments. Despite the undoubted use of this arrangement, it does not fit with the kind of introduction that is most common, which we attribute to possibly coinciding with the kind that is second in repetitions. This is especially noticeable in the number of instruments, as more than a 40% have 2 to 3 concurrent instruments. This brought us to trying to give the guitar a riff, which we thought should resemble an arpeggio. The rest of the instruments' lines are less interesting. We gave the bass guitar a simple, undecorated, melody, the synthesizer a plain, straight forward, harmonic function, and the percussion a simple rhythm that did not include high hats, albeit we were unsure whether to add them. The hardest part of the process was figuring out how to unify the results of the previous phases into a singular piece.

In this manner, the song starts with a 4-measure riff that is accompanied towards the end of the loop by a sound that is, indeed, a reversed cymbal. It then becomes suspended on the environmental synthesizer and simplistic percussion in the verse. And no more instruments enter until the pre-chorus, when the bass guitar enters, and the riff is

¹⁰ DAW: Acronym of Digital Audio Workstation; editing software oriented towards audio and music.

temporarily simplified. They all momentarily stop before the chorus, which has the same instrumentation as the pre-chorus except with a more noticeable riff. The prior is repeated in the next verse, pre-chorus, and chorus, before arriving to the bridge, when the riff stops and is substituted by short decorations at the beginning of each measure. The environmental synthesizer and drum-kit keep their lines, but the bass goes on to do a semibreve-based melody that is maintained for 4 measures, a time when the return of the usual bass line seeks to inspire a crescendo in intensity. The chorus starts quiet but soon gets as usual before finishing and finally leading to a short outro that shows no significant change in instrumentation.

The song closes in tension. We subject this decision on our knowledge that pop songs need intend to leave the listener wanting more and that pop songs end at “the best part”; suspensive ends should have this effect. We did so by finishing unresolved and on an offbeat, simply repeating the existing loop.

We then recorded the voice lines; during the rehearsal we contemplated changing the guitar for a synthesizer, as we did not like its timbre. But in the end, we settled on the guitar. We struggled to imitate the vocal technique, especially since vibrato would come out from habit. We tried to hide it by using artificial tuning.

Editing was not our priority, but we tried to imitate to some extent the style pop music has. As such, we applied reverberation and attempted to correctly equalize the tracks. In addition, a heavy compression was applied on the master track as to lower dynamic variation.

The score to the chorus’ accompaniment is available as the front page for anyone who might be interested.

8. Problems and obstacles

Despite our best attempt not to, we found a variety of problems that diffculted the collection of the information that is so important to this study. The causes are varied: from a lack of planning to an overly optimistic estimation of the time that would be required; some are of unknown origin.

There were, for instance, times when we found by chance things that did not seem correct in our data. This could have originated from us mistakenly changing the criteria enforced on some elements.

Subjects such as instrumentation and dynamics were tackled in various ways before deciding on the final methodology, and each was advanced to an important extent before the change. This lost time contributed to us lacking the time to properly do later phases.

In another instance, having recently finished the second phase, we found a part of an excel table to be missing. We luckily had a copy of the document, but we do not know how this kind of technical errors could have affected the data in previous, hypothetical cases.

In the end we attempted to amend any problem we found as to get reliable data. But we are conscious that this is another factor to taking our results with caution.

Conclusion

After our research, we have been able to find, with varying certainty, a variety of elements that can currently be attributed to pop music. It is, in general terms, repetitive and simplistic. It encourages dancing, and its objective is commercial success. The results of the analysis were foreseeable, albeit surprising in most occasions for both the inconsistency shown by the genre and for refuting some of our conceptions.

Pop music is repetitive in many ways. Its melodies are made of short, simplistic melodic constructions and of variations of the same, accompanied by equally straightforward ensembles of well-known instruments that have established roles and play looping harmonic progressions, and its lyrics somewhat poetic but have a limited vocabulary. We would like to attribute these characteristics to having a commercial purpose, as pop songs are in turn easy to understand and memorize and, thus, catchy.

Today's pop music tends to treat overall sentiments of love and attraction, breakups being an especially relevant subdivision of it. Tempo draws in figure 12 a curve that is topped by 90BPM, value that is neither too fast or too slow. Even so, a favourability towards higher tempos is shown for values up to 120BPM. Instrumental variety is shallow, mainly using drum kits, guitars, bass guitars, pianos, string ensembles, and a variety of synthesizers. These are selected in a quantity that clearly ranges, without counting vocal accompaniments and some percussion instruments, from 3 to 5 instruments, although data does not show to have more than 4 concurrent instruments in so many cases. We believe that this fifth instrument could make its appearance in certain sections in leading positions or in substitution of another. Structures are diverse when compared to our initial expectation, which can be seen in the little number of exact coincidences in our selection. This means that there is usually at least an element that differs in some way from the norm. What they are consistent in having is an intro and, in little more than half the cases, outros.

Some of these trends could, again, be attributed in some measure to the ends to meet. They make logical sense from the standpoint of quickly producing songs that appeal to a broad public. Love is a popular theme, and the tempos that stand out are not hard to dance to, in contrast to slower rates. Having a limited selection of popular instruments aids in having the listener feel familiarized, but it could also be, as it has been said before, a consequence of the quantity of composers that compose pieces of the genre. With respect to structure, although we cannot be sure, using our results, of its consistency, we trust, based on our experience with the selection of songs, that they always maintain some basic elements that are often elaborated on with little variations to sound more interesting through multiple passes.

Other current trends include having no dynamics except in the voice, possibly for expression, using a standard duration of 8 measures for every section but the intro and outro, which could testify to the genre's hurry to deliver ideas, having strong choruses that are often preceded by harmonically oriented pre-choruses, and adding accompanying vocals toward the end, which is surely done to rise the energy before closing.

Although these qualities are more specific and perhaps more susceptible to be left behind in time than the prior, that does not make them less interesting. They are, in conjunction, the elements that characterise today's pop music.

Overall, it can be observed how “pop music” does not represent a singular sonority, but a complex of mainstream musical pieces of commercial purpose.

Our objective in the practical section was to represent pop as a genre by uniting its most relevant elements into a song, and although we believe to have captured some well enough, there are some subjects to improve. The finished result could be called generic, but the result is not perfect in anyway, and we do not have clear knowledge of the extent to which a better production could have made it more like our sample of pop songs. We can see flaws in our end product. The melody came out too reliant on semiquavers and on a single note and probably should have been treated with more care on phase 3, the lyrics are too direct in some places, the accompaniment, in our opinion, does not entirely fit the genre, and we think the emotional intensity is too plain (we could not get the chorus to stand out enough). In addition, we struggled to imitate the vocal technique of pop singers.

We reach the conclusion that the results of the 3rd phase of the practical section are either incorrect or incomplete. We would point towards the latter.

These results conduct us to finally questioning if our hypothesis on “generic” music was correct. On if this quality is, indeed, only brought about by familiarity and predictability. The song we wrote takes inspiration in many popular pop songs whilst abiding to our statistical results. Its elements are, in exception of those that we failed to represent, a portrayal of actual tendencies that should be known by and unsurprising to any avid listener of the genre, which according to our definition would make it deserving of the title. We recognize our song as such, but, as we established previously, this attribute is of a subjective existence. A piece can be “generic” to some whilst being new-fangled to others in factor of many other things such as musical preference. Reviewing this, given we are no fans of pop, there is a possibility that our composition could not be perceived as such in the opinion of the enjoyers of pop music.

“Generic” is, as an adjective, subjectively attributed by the listener and, as such, we do not agree with assuring the degree of our success.

Throughout the length of this paper, we have sought to understand style, genre, and current tendencies to conclude in the writing of a “generic” song that has resulted partially satisfactory, with its shortcomings serving to better illustrate pop music's characteristics. And ultimately, we managed to attach a possible meaning to “generic”.

Although the results are not perfect, we have acquired through the process and through the writing of the song a better understanding of the musical mainstream, which we can now apply in future projects. We have also grown to appreciate the intricacies and difficulties of writing pop songs, learning to look up to the minds that can make music that stands out despite its simplicity, especially regarding melody, and write the memorable lyrics that are often the most intricate part of the composition.

Bibliografia

- Borrero, F. D. (2008, December). *Los elementos de la música*. Retrieved 12 October, 2022, from <https://infolibros.org/pdfview/15266-los-elementos-de-la-musica-articulo-francisco-daniel-borrero-morelos/>
- Catalunya, I. O. (n.d.). *Anàlisi musical*. Retrieved October 15, 2022, from <https://educaciodigital.cat/>: <https://educaciodigital.cat/ioc-batx/moodle/course/view.php?id=28#section-4>
- Dannenberg, R. B. (2010). *Style in Music*. Retrieved from Carnegie Mellon University: <https://www.cs.cmu.edu/~rbd/papers/rbd-style-2009.pdf>
- Elsevier Inc. (2009). *From Demo to Delivery: The Process of Production*.
- Ghlonn, J. M. (2021, April 21). THE COMMERCIALIZATION OF MUSIC: HOW ROCK LOST ITS ROLL. *Hampton Institute*. Retrieved from <https://www.hamptonthink.org/read/the-commercialization-of-music-how-rock-lost-its-roll>
- Herrera, E. (1990). *Teoría Musical y Armonía Moderna vol.1*. Antoni Bosch Editor, S.A.
- Hutchinson, R. (n.d.). *Music Theory for the 21st-Century Classroom*. Retrieved from <https://musictheory.pugetsound.edu/mt21c/MusicTheory.html>
- Jewalikar, V., & Fragapane, F. (2015). Hip hop has the largest average vocabulary size followed by Heavy Metal. *Musixmatch*. Retrieved from http://lab.musixmatch.com/vocabulary_genres/
- Jewalikar, V., & Verma, N. (2015). THE LARGEST VOCABULARY IN MUSIC. *Musixmatch*. Retrieved from http://lab.musixmatch.com/vocabulary_genres/
- Lessons. (n.d.). Retrieved October 16, 2022, from [musictheory.net: https://www.musictheory.net/lessons](https://www.musictheory.net/lessons)
- Little, D. (2017). *Cómo componer canciones*. Barcelona: Redbook Ediciones.
- Madison, G., & Schiölde, G. (2017). Repeated Listening Increases the Liking for Music Regardless of Its Complexity: Implications for the Appreciation and Aesthetics of Music. *Frontiers in Neuroscience*. Retrieved from <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5374342/>
- Percino, G., Klimek, P., & Thurner, S. (2014, December 31). Instrumentational Complexity of Music Genres and Why Simplicity Sells. *Plos One*. Retrieved from <https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0115255>
- Pop music. (2022, June 28). Retrieved from New World Encyclopedia: https://www.newworldencyclopedia.org/p/index.php?title=Pop_music&oldid=1044857
- Warner, T. (2003). *Pop Music Technology and Creativity*. London: Ashgate Publishing.
- @Enenra.(2017). Reddit post that questions what "generic" music is. https://www.reddit.com/r/LetsTalkMusic/comments/6onhvw/what_makes_music_generic/