Put on Repeat: The Strategic Use of Musical Repetition in Film

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A research Paper submitted to the University of Dublin,
In partial fulfillment of the requirements for the degree of
Master of Science Interactive Digital Media

2018

"So long as the human spirit thrives on this planet, music in some living form will accompany and sustain it and give it expressive meaning."
- Aaron Copland

Declaration

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ABSTRACT

In this research paper will focus on the significant impact that music and sound play in film. Audio is strategically and methodically used to make the viewer *feel* a certain way and alter the overall experience of watching the film. We know that music evokes emotion, therefore, I will analyze the specific way that music is used in film and how the repetitive use of music and sounds impacts the emotional implication and memory of a compelling story. Due to the extensive research done on emotions evoked by music, I will not analyze what an emotion *is* or the different types of emotions but instead how music impacts emotional sensors in the brain. Additionally, I will analyze different creative techniques used to successfully apply music to motion pictures. Emotions are subjective and the reactions that people have to the same pieces of music or sounds will not be 100% the same, however, there is a pattern around the style of music and the emotions evoked. I will use these studies and apply them to my own evaluation of the following films: *Up, Get Out, La La Land and Inception*.

Disclaimer: I discuss the following films and ultimately disclose plots, twists and endings of each.

- American Psycho
- Get Out
- Inception
- Jaws
- La La Land
- Me Before You
- Up

ACKNOWLEDGEMENTS

I would like to thank my professor and supervisor Jack Cawley. His guidance and insight was instrumental to my success on this research paper. Jack always provided invaluable feedback and directed me through every step of the process.

I would also like to thank Vivienne O'Kelly who aided me in my initial proposal for the research paper. Vivienne provided me with different angles and perspectives on narrative in film, which was significant in narrowing down my topic.

Finally, I would like to acknowledge my family who has supported me in my journey to higher education. I took a big leap this year and could not have done it without my family's encouragement and unconditional help. For that, I am extremely grateful.

TABLE OF CONTENTS

TITLE **PAGE**

CHAPTER 1: Introduction

Moving pictures revolutionized the way stories are told, opening up a world beyond what was ever imagined. We have been introduced to a land of superheroes and villains, zombie apocalypses, and romantic triangles between a human, a vampire and a werewolf. We have been catapulted into a story of wizards and witches and taken to Pandora in the Alpha Centauri star system. Most importantly, we walk out of the theatre with a feeling that we've truly experienced these otherwise impossible events. The settings, characters, actions and emotions involved in a story, are now shown on a high definition, bright screen in vivid detail with the use of numerous stylistic elements to present the story in a compelling manor. Additionally, music and sounds are blaring at us, forcing our bodies into feeling every thump, creek, bang, in our stomachs and chest. "The experience of music often seems like the experience of some sort of motion, a thing that is virtually enacted rather than declaratively known (Margulis, 2014, p.65). Post-production techniques have flourished with the technological developments in the past decade allowing for a more realistic sense of narration, even in the most unrealistic film genres. With the development of post-production capabilities, the use of music and sound, and the necessity for both, has not wavered. Before dialogue was possible in film, music was used to tell the story. In movies, music is a key element in creating a lasting impact on the viewer. That is not to say that the visuals are unimportant because they are critical in conveying a visual story, however, the entire mood can change simply based on the music that is selected or based on the use of sounds throughout the film. There is no doubt that music evokes emotion and film has been using music as an emotional technique for centuries. There are a number of studies that have been conducted on the emotions that music can evoke and how music is used in specific instances throughout film to enhance that emotion; This is a key facet of my analysis. I will explicitly look into the repetitive elements in music that makes repetition effective and emotionally absorbing.

Music is inherently repetitive. In every song there is a structure that is followed. Each song follows the same general guidelines of Intro > verse > chorus > verse > chorus > chorus > outro. "The chorus contains the main idea, or big picture, of what is being expressed lyrically and musically. It is repeated throughout the song, and the melody and lyric rarely vary" (Davidson, 1996, p.6). Going beyond the repetition within the piece, repeating music or sounds at different stages of a film, unequivocally intensifies the emotion and memory rendered from a film. I will explore the repetitive nature of audio in film and how that contributes to a more emotional and memorable experience for the viewer. We are more likely to remember a story or incident if there is emotion attached to that event, therefore, using music to evoke emotion while a story is being told, additionally leads to a more stimulating recollection of the film narrative.

In my research I will explore the cognitive effect that music has on memory and how the repetitive nature of music affects the brain. I will start out by developing an understanding for audio post-production and music techniques, how they are used, and the importance of those techniques on the outcome of the story. By analyzing the many studies around music's effect on cognitive abilities, I will

be able to observe those effects when in use and lastly, how these techniques are applied in various genres of film. A large scope of my research will revolve around when audio is *repeated* and for what purpose. I will focus my research on analyzing the following films: *Up*, a romantic, animated comedy released in 2009, *Get Out*, a horror film released in 2017, *La La Land*, a musical, romantic comedy released in 2016 and *Inception*, a science fiction thriller released in 2010. Repetition in music has the ability to impact memory, satisfy our emotional expectations and activates pleasure sensors in the brain.

CHAPTER 2: Audio Post-Production Editing: Composition and Application

Music "... is the art of arranging sound and silence in time. Sound and silence are omnipresent in nature, but in music, these elements imply or convey a purpose: music is a language used to evoke, express, and even intensify emotions" (Arias, 2014). Music and sounds add aesthetics to the ear that guide the viewer's experience and emotions. There are four different elements that need to be considered when thinking about audio post-production; the use of mainstream music, scores, sounds, and even silence. All of these elements play a part in impacting stories being told on screen. It can be subtle or it can be the viewer's main focus, but either way, music and sounds, or lack thereof, are essential in framing the film's narrative. "The emotional power of music is the reason for its application in areas as diverse as the gaming industry, film industry, marketing, and music therapy, yet the scientific insights into this phenomenon are far from complete or revealing" (Eerola, 2013).

2.1 Hollywood Score vs. Mainstream Songs

During post-production, there is a *spotting session*. During the *spotting session,* a dedicated team sits down together to screen the movie in order to determine if and when music, sounds, or silence needs to be present. The team often includes the producer, director, editor, executive producer, and in some cases the music editor and the music supervisor. This team decides every explicit moment in which a sound needs to be added or exaggerated, and when music should be included to increase the interpretation and emotion of the scene. When a decision has been made if and where music is needed, there is then the decision of what style of music will be used; scoring the film with a professional composer, a musical soundtrack or possibly the use of both. At any point that music is applied to a segment of film, it automatically has an effect on the moving picture - "... just as whatever two words a poet puts together will produce a meaning different from that of each word separately" (Gorbman, 1980).

The composer's job is to establish the theme and message that will be communicated to the audience. It is a difficult task since they need to build and determine the framework for a piece that will tell an explicit story parallel to the visual representation. While composing a score for a film is like being given all of the colors in the world to paint a picture, it still comes with limitations. Typically, the scoring processes happen within 6 weeks of the *spotting session,* therefore there is not much time for the composers to let inspiration hit. Music has a positive effect on memory and emotions regardless of one's

familiarity with the music, therefore, newly composed music for the purpose of a film can and will effect one's cognitive reactions. This will be discussed further in Chapter 3.

Unlike Hollywood scores, mainstream music are typically already familiar and the viewer has an emotional connection or memory attached to that piece. This can either hinder or aid the viewer's experience of the film now that there is a connection between the film and the soundtrack. The positive side to using a mainstream song is that is can help establish the time period in which the film is taking place. For example, in *The Notebook*, the songs are jazzy with an upbeat tempo typically played by a saxophone and trumpet, which is indicative of the late 1930s, during WWII time period. The music automatically sets the scene for which century the viewer is experiencing. Also, many times the use of a mainstream song can attach an element of humor to the scene. For example, in *Finding Dory*, the scene where the animals have high jacked the transportation van and are flying off of a bridge, is complete and utter chaos (Figure 1). However, during this slow motion scene, the song *What a Wonderful World* by Louis Armstrong is played in the background and creates the foundation for this ultimately hilarious scene.

Figure 1: Finding Dory at 01:22:50 (Source: Finding Dory film)

Not everyone's preference towards a famous artist is the same and personal opinions or feelings towards the artist can get in the way of the story of the film. For example, Ellie Goulding's song *Love Me Like You Do* is the official song for Fifty Shades of Grey. The song was released prior to the film coming out and was played on popular radio channels. The promotion of the song leaves time for the listeners to come up with their own interpretation and experience with the piece - and also means they will have a favourable or unfavourable opinion of the song, which may impact how they react when they hear it in the film. Either way, there is a link between the viewer and the audio prior to the narrative of the film being explored. Additionally, if someone has a strong preference towards a particular artist or genre of music and that artist is used in film, then the viewer's emotional experience during the film will be more positive and they will likely leave the theatre happy and satisfied with their viewing experience. The flip

side to using mainstream music is that since it was not composed for the purpose of aiding the visuals on screen, it can be somewhat detached from the narrative of the film.

2.2 Songs, Sounds and Story

David Raskin, the Grandfather of Film Music, wrote that music's admitted purpose in films is "to help realize the meaning of a film" (Hossain, 2015). The narrative of a film can be altered depending on what coinciding music or sounds the viewer hears along with the visual representation. A YouTube video done by Shelly Craig (2012), shows how changing the music of a scene in *Pirates of the Caribbean* changes the mood in very dramatic ways. The scene where Captain Jack Sparrow is coming back to shore and standing at the top of his ship is changed 4 times to illicit the emotions of (1) Scary and Foreboding (2) Comical (3) Sad and Thoughtful (4) Original Theme.

Figure 2: Pirates of the Caribbean (Source: YouTube)

By simply changing the music that was played in this scene, the mood of the scene changed too. Music can enhance or alter one's feelings and emotions during specific parts of a film that will ultimately impact the impression of the overall film experience. "[Music] is the systematic fabrication of the atmosphere for the events of which it is itself part and parcel. It seeks to breathe into the pictures some of the life that photography has taken away from them" (Gorbman, 1980). There are eight basic elements of any sound: volume, pitch, contour, rhythm, tempo, timbre, spatial location and reverberation. When our brains hear these elements, it arranges these sounds into a greater notion of meter, harmony and melody – "just as a painter arranges lines into forms" (Levitin, 2016, p.14). Sometimes there is music that makes your stomach turn inside out or even makes your heart ache from sadness but there is also a specific way of using music ironically without damaging the mood of a film. There are two key ways in which music can be used in film: Parallel Sound or Contrapuntal Sound.

2.3 Parallelism and Contrapuntal

Parallel sound is when a song or score is in line with the images that the viewer is seeing on the screen thus it"… specifies a sound that runs with the narrative implications of the images…"(Neumeyer, 2015, p.193). An example of parallel sound would be the gut-wrenching last 10 minutes of the film *Me Before You*. *Me Before You* was released in 2016 and tells the story of a former banker with a passion for adventures and extreme outdoor activities. His name is Will Traynor, and he is left paralyzed by an unfortunate motorcycle accident. Enter Louisa Clark, an optimistic and extremely bubbly girl who loses her job at a bakery and ultimately ends up as a Will's caretaker. They grow close to one another and

inevitably fall in love. The ending scene opens with Clark meeting Will in Switzerland so that he can go through with euthanasia. Throughout the scene (figure 3) of soft dialogue between the two, there is a light piano track playing and the viewer is lost in the witty banter and love these two share but at the point that the audience is taken back to the reality, back to the fact that no matter how strong the love is, Will is not going to change his mind about ending his life. At this moment, the score *Paris* by Craig Armstrong begins to play. It starts off with a violin piercing through and it pulls your stomach up into your throat. This piece is both tragic and beautiful. This parallelism between the happenings on the screen and the music coinciding with the devastating reality is an example of how parallelism aids the visuals and renders the experience that much stronger.

Figure 3: "Me Before You" at 1: 43: 21 (Source: Netflix)

Opposite of Parallel Sound is *Contrapuntal Sound*. "Contrapuntal sound is where the sounds or music is used in contrast with the film or movie clip it has been inserted into. It's sound that does not fit in with the events happening" (Gale, 2012). Essentially, the music goes against the grain of what feels natural to the viewer. The movie American Psycho is a famous film that was released in 2000 about a successful professional who is leading multiples lives. By night he is a vicious serial killer but by day, in true form with psychopathic behavior, he is a completely different person and carries on a regular life. The psychopathic character, Patrick Bateman played by Christian Bale, is at his house getting a co-worker drunk while preparing to axe him to death (figure 4). While Bateman is getting his gloves and raincoat on (to protect himself from the blood splatter, of course) he is incessantly going on about the song *Hip to be Square.* Right before he is about to murder his co-worker, he turns on the song and dances around.

Now the audience knows that they are watching a horror film and a murder is about to be committed but they are also hearing the song *Hip to be Square* by Huey Lewis & The News. This song is quite upbeat and has the rhythm and tone of a typically 1980s rock song. The use of contrapuntal sound in this film is deliberately attempting to mess with the viewer's psyche. The juxtaposition of the psychopath, with this

up-tempo music and brutal murder, gives the audience a somewhat subconscious sense of unbalance and confusion. The contradiction of visuals and sound creates an unstable and unsettling surge of emotions.

Figure 4: American Psycho at 00:28:29 (Source: Netflix)

2.4 Audio Post-Production

When we think of post-production, typically the first thought is the editing process of recorded film footage and usually not about the music and sound editing involved, even though a large part of post-production is the audio editing process. Audio editing is not simply the addition of music to specific scenes in the film, but it is a much more complex and impactful process. "Audio - or its absence - adds depth to images, directs our attention, and speaks with an emotional immediacy that words, or even music, can't often match" (Berman, 2017). If the sounds that are portrayed in the film are not fitting or impactful, the narrative of the film could be derailed. Audio is an extremely important aspect of any film, therefore, there are a number of processes involved. Audio post-production consists of the following processes (Orlowski, 2015):

- Production Dialogue Editing
- ADR (Automated Dialogue Replacement or Looping)
- Sound Effects Design and Editing
- Foley Mixing and Editing
- Music Composition and Editing
- Mixing (also known as re-recording)

For the purposes of this research, the primary focus will be on (1) Sound Effects Design and Editing, (2) Foley Mixing and Editing and (3) Music Composition and Editing. First, sound effects design and

editing is the process of adding sounds that cannot be captured on-set while filming. In Star Wars, the heavy breathing we hear from Darth Vader's helmet and the dramatic "*zoom*" sound we hear when the lightsaber is activated, are prime examples of sound effect design and editing. The sounds that we hear while watching a film are crucial to our engagements in the film and, let's face it, key in the enjoyment of reenacting those sounds. There have been studies on how music has an impact on one's ability to repeat something verbatim versus paraphrasing and potentially changing the precise meaning. In recent studies, it was revealed that "verbatim memory for musical phrases, in contrast to linguistic sentences, was quite good and not subject to the same kind of deterioration over time" (Margulis, 2014, p. 86). Because sound has such an immense impact on our memory, it only makes sense that emotionally connected parts of the film stand out to us long after the film has ended.

Second, Foley mixing is a technique named after Jake Foley. Jack Foley is known as the "father" of Hollywood sound effects because of his innovative techniques of recording everyday sounds during the editing process. This differs from sound effects in that the sounds being recorded are meant to be of actions that are taking place in the film such as footsteps, water trickling in an empty sink, doors creaking open or pouring coffee into a mug. Foley artists sometimes need to get creative with how they come up with sound effects, but more times than not, the sound that we are hearing is not visually the same object or person making the sounds from the source that we see on screen. Michael Maher (2016), wrote in *Foley: The Art of Making Sound Effects*, some common examples and tricks of how to make sounds in film. Those Foley mixing examples are:

- Wave a pair of leather gloves for the sound of birds wings flapping
- Crush a leather pouch filled with corn starch for the sound of footsteps in crunching snow
- Clap two coconut shell halves together for the sound of horse hooves galloping (this trick was used in Monty Python and the Holy Grail).

Third, music composition and editing is the creation and design of music. A composer will create a score for a part of a film that will highlight the intended emotion and message behind the scene. Music editing can also include the use of mainstream music that is edited over the footage, which is also used as part of the soundtrack. Furthermore, in film composition, we hear source music, which includes anything from sounds that we would hear on the television that is being watched in the film or a radio or even sounds that are coming through over a phone. We all know the very famous melodies in the *Titanic* that, to this day, pull at our heartstrings and makes us feel the romance, heartbreak and loss felt during that tragedy. When we hear the woman's soft voice humming the first three notes (figure 5: E, F, G) our minds sink directly to the dramatic and tragic moments we empathize with during the *Titanic* film.

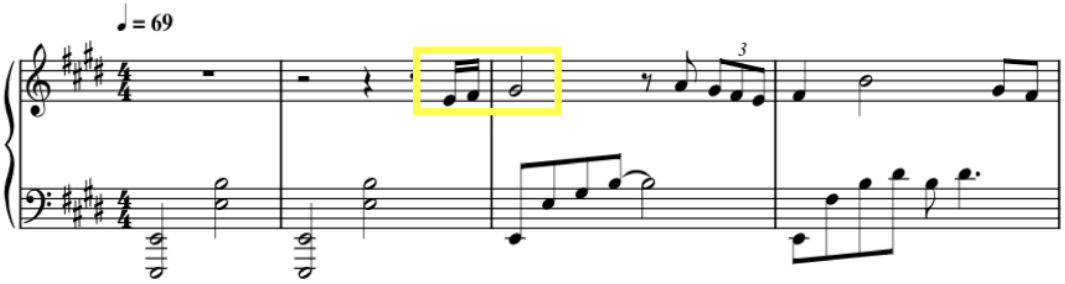

Figure 5: "Hymn to the Sea" composed by James Horner

Another successfully scored film is *Jaws*. If you don't know the film, simply put, it is about beachgoers who are attacked by a great white shark. We know, and most likely reenact, the "dun dun… dun dun… dun dun dun dun dunnnnnnnnn!" portion of the score. Even if we don't know the original source of the score, it is now a sound that connects our emotions and minds to the thought that something thrilling or sneaky is about to take place. Although it is a simple two note piece (figure 6: D, E), this ostinato baseline helps to keep an ominous tone.

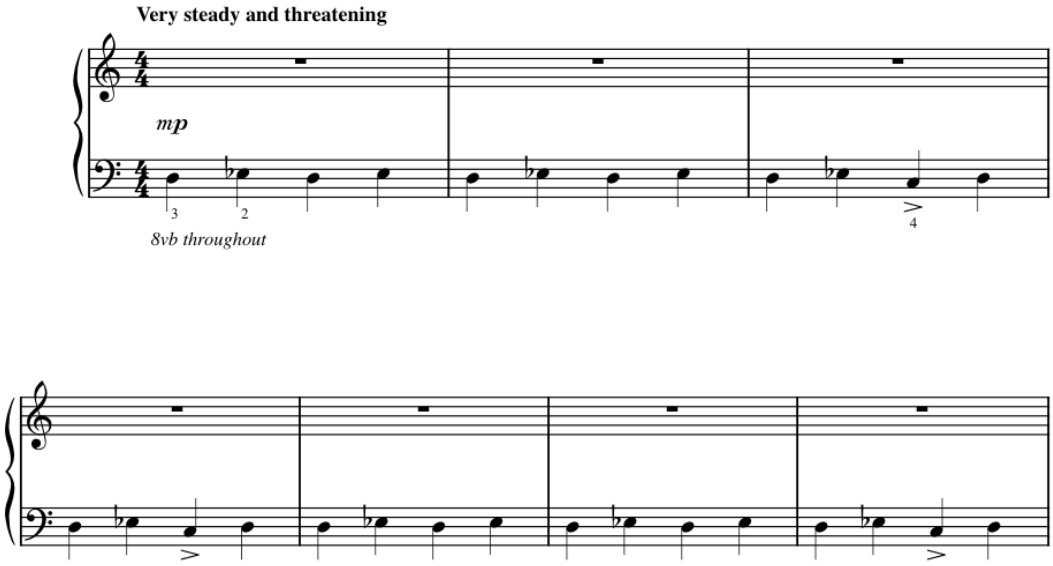

Figure 6: Theme from "Jaws" written by John Williams

CHAPTER 3: Analysis of Repetition of Audio

Psychologically speaking, humans are attracted to things that they have experienced before. Cognitive Scientist, Elizabeth Hellmuth Margulis (2013), explains that repetition of sound, music and even visuals have a positive effect on the human psyche because of the comfortability with those experiences and our ability to link those devices to previous events. Margulis (2013) explains it as *The Mere Exposure Effect*. This effect is inclusive of the repetition of a song or even elements within that song. "Repetition in

music is ‘deeply compelling.’ It connects each bit of music to the notes that follows” (Anderson, 2014). Repeating notes in a song is the fundamental composition that makes music melodious. It gives a song a rhythm and flow, which, allows the listener to understand the movement of the piece and move along with it.

Copland (2011) outlines how combining music and film creates a different level of effectiveness on the human mind. The different levels are as follows: (1) creating a more convincing atmosphere of space and time, (2) underlying psychological refinements - the unspoken thoughts of a character, or the unseen implications of a situation, (3) serving as a kind of neutral background filler, (4) building a sense of continuity, and (5) underpinning the theatrical build-up of a scene, and rounding it off with a sense of finality. Some may think that it is easy to convey emotion through film because the director has the power to show the audience exactly what (s)he wants them to see. But film is a two-dimensional medium and we live in a three-dimensional world, therefore, directors need the help of music to create the feelings of space and time, to pull out the emotions that are not explicitly told to the audience and building a cohesive story. During a film, the audience will likely hear the same music at least eight times throughout (based on research and implementation in Chapter 4). This is not for a lack of musical pieces created or resources to score a film, but due to the fact that “familiar music can have a transportive quality… such that when we re-hear familiar repertoire, vivid episodic memories arise” (Margulis, 2014, p.10). Music is powerful enough to subconsciously take us back to the exact moment where that piece of music was first played. Particular moments and feelings become attached to a musical experience. The connection between audio and memory has to do with emotions and the aesthetically pleasing quality of music.

3.1 Repetition and Emotions

In Margulis’ book, *On Repeat: How Music Plays the Mind* (2014), she lays out three main function of auditory repetition. First, is learning and level-shifting, second is segmentation and third is expectation. We enjoy music *because* of the repetition and our ability to naturally follow along even if we have not heard the song before. There is a part of our brain, that in anticipation of a listener’s favorite part of a song, releases dopamine which is the chemical responsible for happiness; this is known as *anticipatory listening phase* (McGilchrist, 2011). Our expectation of what is to come is a very important part of what makes music enjoyable to the listener; when we expect a particular motif in a song and the anticipation is satisfied, we become happy as a result. A noted scholar in both music and neurophysiology, Manfred Cl, “indicated that appropriately structured music acts on the nervous system like a key on a lock activating brain processes with corresponding emotional reactions” (Bruner, 1990).

Studies show that participants that listen to sad music and then are shown a neutral facial expression will describe the expression as sad, whereas people who are exposed to happy music will describe the neutral expression as happy (Logeswaran, 2009). So, what does that tell us? Our brain’s chemicals change based on the music that we listen to. This chemical change affects how we perceive the world around us,

therefore, changing our mood and emotions. Music enhances every aspect of our lives and filmmakers use this as a technique to make films more captivating to their viewers. "Listening to music affects an intricate set of complex processing systems in the brain, such as systems associated with sensory-motor processing as well as functional elements implicated in memory, cognition and emotion or mood fluctuation" (Wilkins, 2014).

Neuroscientist, Aniruddh Patel (2015), discusses studies that have been done since the 1990's on what happens to the brain when music is changed but the visuals stay the same. Neuroimaging shows that music:

1. Leads to changed expectations about events
2. Leads to associations in the brain that are not necessarily shown on the screen
3. Helps to tell the listener if the story is resolved or not
4. Changes the way you interpret characters and their relationships (in terms of what you're seeing up on the screen)
5. Influences what you remember from a scene
6. Gives you a sense of being inside the world of the film vs. being an observer from the outside world
7.

Neurotransmitters affiliated with learning sensors in the brain can be heightened by musical cues "…thereby strengthening the synaptic networks underlying memory" (Editors, 2016). Burunant (2014) conducted a study on the brain and it's reaction to the repetition within music. Every study links back to the activation of the hippocampus which in where memories are stored. Emotions, aesthetics and memories are all linked to one another and, therefore, collectively impacted by music.

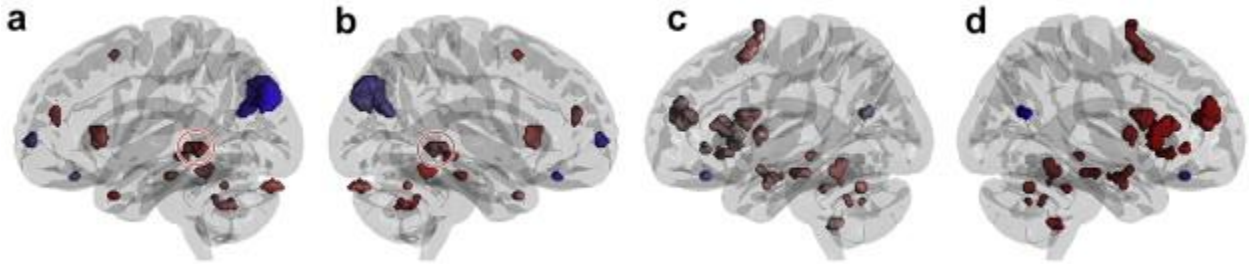

Figure 7: "Left and right lateral ([a] [d]) and mid-sagittal ([b] [c]) views of the thresholded statistical map displaying positive (red) and negative (blue) correlations with the white matter regressor. The hippocampal activation is indicated in the left hemisphere. The results revealed the brain areas strongly responding to repetition of motifs in the music" (Burunat, 2014).

3.2 Repetition and Aesthetics

It is not specifically repetition of musical instruments, but of any object that can create a song-like melody to the ear. The very act of "repeating something can render that thing melodious—even the sound of a shovel being dragged across the pavement" (Karen Hopkin). This type of "music" has an

effect on our emotional state in the same way that a piece of music does. If you take, for example, the sound of a ticking clock, or the tapping of a spoon against a glass, that repetition resembles the melody of a song. This type of repetition is hypnotic and meditational style music but it still evokes emotion through the use of sound and is a powerful way of creating a transient-like space.

Why do we find this use of repetition in music desirable? Margulis (2014) puts this phenomenon into perspective by comparing our same actions and reactions towards music to that of listening to someone tell the same story over and over. For some reason, the idea of being around someone who finished his or her story, then starts all over again is very odd, however, humans will listen to a song and then start it from the beginning and then proceed to listen to it repeatedly. Similarly, while listening to the radio, we typically hear the same song four or five times in a forty-five minute car ride, and each time, we eagerly sing along or bob our heads to the beat of the song.

Repetition is a mysterious element to our lives. Music is found in all human cultures but not just that, musical repetition is also present. "Repetition is not an arbitrary characteristic that has arisen in particular style of music; rather, it is a fundamental characteristic of what we experience as music" (Margulis, 2014, p. 5). Repetition can be musical when it comes to the sound of a beating drum, the humming of the same notes repeatedly, or the singing of the same lines over and over. No matter where one is from, familiarity with repetition is certain. Ethnomusicologist, Nettl (1983) once said that musical repetition is a "rare cultural universal." That is to say that the repetition in music is the one and only characteristic presented in the music of "every known human culture… This repetition can happen within a piece, or across multiple hearings" (Margulis, 2013). Although, repetition is a cultural universal, what we find aesthetically pleasing to the ear has a lot to do with our cultural influence. While listening to music, the human brain starts to look for patterns in the song. We try to determine if the sounds were organized by humans and seek out patterns that are recognizable. "This process helps us to decide if this is music we want to enjoy or not and helps us to know if we should sit and listen to it or perhaps dance to it, perhaps march" (Garfias, 2004, p.129).

Even the composition of music can be repetitive in the use of the same chords or notes recurring throughout the piece. Repetition of notes, not only can have an effect on the beauty of a song but also on the memory of the listener. The use of songs throughout a film can help enhance the meaning of the visuals that the audience is seeing but also using specific pieces of music to enforce an idea or theme. Bhattacharya (2017) compellingly argues that music can be used as a time-warp because of its unique way of taking a listener back to a moment where they heard the song before or because of its use in transitions throughout film.

> "Music takes place in time, but repetition beguilingly makes it knowable in the way of something outside of time. It enables us to "look" at a passage as a whole, even while it's progressing moment by moment. But this changed perspective brought by repetition doesn't feel like holding a score

> and looking at a passage's notation as it progresses. Rather, it feels like a different way of inhabiting a passage — a different kind of orientation" (Margulis, 2014, p.7).

Even throughout repetition, our emotions and feelings can change. Have you ever had a favorite song and loved to listen to it on repeat? Then one day, that song is playing at a different point in your life or correlated with something different? At that moment, the meaning you associated with the song is altered and in that current moment, the song possesses an entirely different personal meaning. "Music can never have enough of saying over again what has already been said, not once or twice, but dozens of times; hardly does a section, which consists largely of repetition, come to an end, before the whole story is happily told all over again" (Margulis, 2014, p.1). Although, repetition in other elements of our lives are not always pleasing to the ear, the construction of a song is important to how our brain processes music and decides if that song is aesthetically pleasing. What makes music musical and not simply noise or unorganized sounds has to do with the way in which the musical elements combine with the end result of continuity between them. "When these basic elements combine and form relationships with one another in a meaningful way, they give rise to the higher-order concepts such as meter, key, melody, and harmony" (Levitin, 2016, p. 15).

It is still speculative as to why we favor the music that we do. But what we do know is that "music seems to 'selectively activate' neurochemical systems and brain structures associated with positive mood, emotion regulation, attention and memory in ways that promote beneficial changes..." (Heid, 2018). More parts of our brains are activated when we are listening to music that we have a preference towards. "When listening to liked and disliked music, the hippocampi and auditory cortex were within the same community (a). The location of the hippocampi is indicated by the yellow arrows. When listening to a favorite song, the hippocampi were functionally separate from the auditory cortex and became an isolated community (b). Color indicates the consistency across subjects as assessed using scaled inclusivity" (Wilkins, 2014). As shown in Figure 8, when listening to a favorite song the memory part of the brain (Hippocampus) is activated.

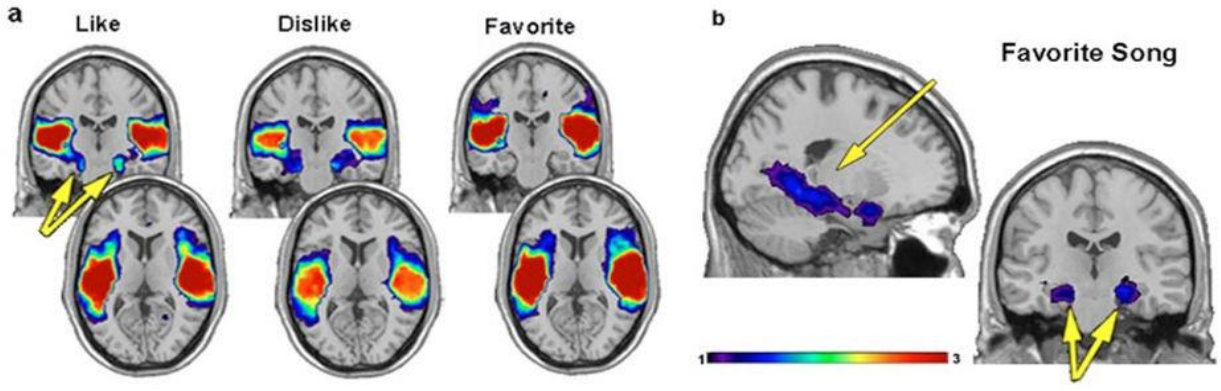

Figure 8: Demonstration of differences in the community structure of the hippocampus and auditory cortex when listening to a favorite song.

3.3 Repetition and Memory

Growing up we hear that "practice makes perfect." This is applied to anything we do - sports, excelling in school, learning an instrument, or rehearsing for a play. The idea that if we repeat our actions then we will become better, is drilled into us at early stages of our lives. This methodology came to be because we are more likely to remember something or remember how to do something if it becomes second nature or muscle memory. Levitin (2016) argues that we need memory for music to exist, primarily because we need the ability to recognize what notes or melodies are going to come next.

> "Music works because we remember the tones we have just heard and are relating them to the ones that are just now being played. Those groups of tones—phrases—might come up later in the piece in a variation or a transposition that tickles our memory system at the same time as it activates our emotional centers...Repetition, when done skillfully by a master composer, is emotionally satisfying to our brains, and makes the listening experience as pleasurable as it is" (Levitin, 2016, p. 162-163).

When our brains know what to expect in the upcoming melody of a song, it is more pleasurable to the listener. That is why we have more of an emotional connection with characters in a film that are associated with a song; in some ways we feel a familiarity to those characters. This also comes back to *The Mere Exposure Effect*; the idea that humans are inherently attracted to things that they have already experienced before. If we are comfortable with something and it has a sense of familiarity, then it is easier to become emotionally impacted by that thing (i.e. character or song).

Repetition of notes within a song can have an effect on the beauty of a piece and also on the memory of the listener. The use of songs throughout a film can help enhance the meaning of the visuals that the audience is seeing but also using specific pieces of music to enforce an idea or theme. Have you ever wondered why important information is better remembered when put into song? Hence why we learn the alphabet to a rhythmic beat, and (in America) we learn the 50 States via a song. Tying information to a melody makes a connection in your brain that produces better recall. Additionally, when listening to music that is strongly preferred "people report they often experience deeply personal, often unsolicited and emotionally-laden, thoughts and memories" (Wilkins, 2014). A study done by Stanford researchers showed that "musical techniques used by composers 200 years ago help the brain organize incoming information" (Baker, 2007). The brain sorts out different events by a process called event segmentation. The study shows that "the brain partitions information into meaningful chunks by extracting information about beginnings, endings and the boundaries between events" (Baker, 2007). When listening to music, our brains are deconstructing and compartmentalizing the music in the same way.

Memory and music work together to create each other. In a TedTalk with Jessica Grahn (2013), she has the audience clap in sync to the tones that she is playing in a particular rhythm. The audience starts clapping along and is hitting their hands together at the exact moment that the tone is being played.

Grahn explains to the audience that we are able to do this because we predict when the next sound is going to be played and actually start moving our hands together before we even hear the note. Other species do not have the ability to predict a future note therefore, having the memory of tempo helps us to predict and appreciate a song. In another TedTalk by Ardon Shorr (2012) he shares a quote by famous Neurologist Oliver Sacks, "more of the brain is involved in perception and response to music than to language or anything else." As you can see in Figure 9, there are nine regions of the brain that are activated while listening to music: Nucleus Accumbens & Amygdala, Prefrontal Cortex, Motor Cortex, Corpus Callosum, Sensory Cortex, Auditory Cortex, Hippocampus, Visual Cortex, & Cerebellum. "Music, emotion and autobiographical memories come together in an area of the brain called the pre-frontal cortex, connecting with many other parts of the brain" (Science, 2017).

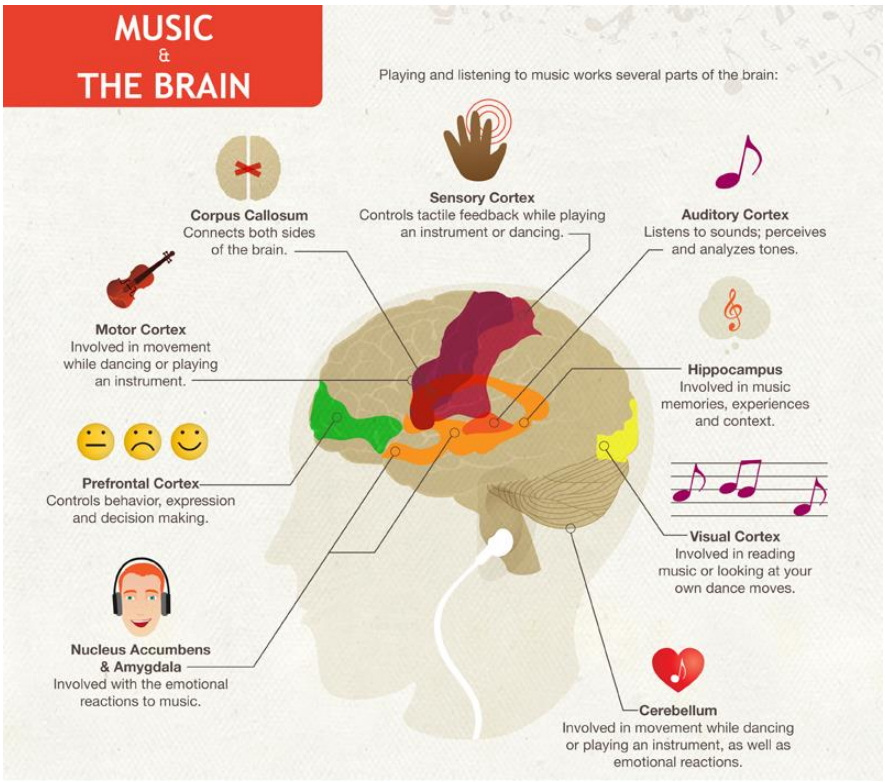

Figure 9: Areas of the brain that are activated by music (Science, 2017).

CHAPTER 4: Design Implementation & Results: Repetition of Music in film

For the implementation of this research, I will take a look at how songs, scores, and sounds are used in a repetitive way in film. Based on prior research, understanding for the use of repetition in film and how repetition impacts the mind, I will analyze films (1) that repeat *scores* (*Up*), (2) that repeat *sounds* (*Get Out*), (3) that repeat lyrical scores (*La La Land*) and (4) that repeat *songs and scores* (*Inception*), and I will analyze the music used throughout the entire film but focusing on specific events and uses of music that are particularly appealing.

> "Music was introduced as a kind of antidote against the picture. The need was felt to spare the spectator the unpleasantness involved in seeing effigies of living, acting, and even speaking persons, who were at the same time silent. The fact that they are living and nonliving at the same time is what constitutes their ghostly character, and music was introduced not to supply them with the life they lacked - but to exorcise fear or help the spectator absorb the shock" by composer Hanns Eisler (Gorbman, 1980).

4.1 Repetition in Animation – Up

Up is a beautifully illustrated, animated film released in 2009, about lifelong love, loss and achieving dreams. Ellie and Carl find each other when they are children and end up getting married, living through typical marital problems, and growing old together. True to real life, their dream of making it to Paradise Falls was never realized, and by the time Carl decided to get them there, Ellie falls ill and passes away. Within the first 10 minutes of the film, the viewer goes through an emotional rollercoaster. In a short period of time, the viewer sees happiness, love, struggle, illness, and death. With every changing moment in their life montage, the same musical notes are used (figure 10) but the tempo changes to help guide the viewer's mood through the speedy events.

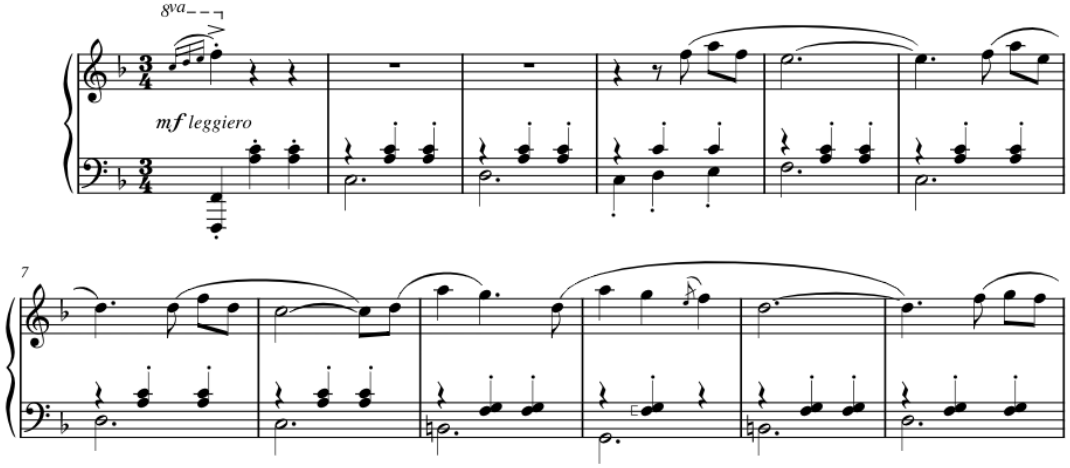

Figure 10: Main Theme - Disney Pixar's Up: First two lines of music (Source: Kyle Landry)

Ellie first introduces herself to Carl when they are young children. At the moment that she turns to him and says her name, the song *We're in the Club Now* starts to play (00:04:42). This establishes a connection between this song to Carl and Ellie's relationship. This allows for the audience to connect the memories and emotions that they felt during the first montage with the events that are taking place when the song plays again. Since the movie quickly established a roughly 75-year relationship between the two, the audience needs to be emotionally invested in the couple early on in the story. Pixar did a great job of creating that connection by showing the viewer their life in a flash but also adjusting the tempo of the music to aid in *how* the audience should be feeling. The couple's life quickly plays before the audience's eyes only 00:07:31 into the film. Carl is carrying Ellie up to their new, rundown home after their wedding when the music starts to play. The audience sees snippets of their lives from the couple watching the clouds change shapes, to preparing a nursery for a child then to finding out that she can't have kids. At this point in their lives they decide to start saving to go to Paradise Falls but, again, life happens. They go through hard times (repairing the car, the house and broken bones) until they are old together. But through it all, their love prevails, and Ellie and Carl are shown dancing hand in hand in their living room. Realizing that they never made it to Paradise Falls, Carl buys two tickets to surprise Elle but she falls ill. The tempo of the music at this stage is presto at 180bpm but throughout the song that tempo changes depending on what event in their lives they are experiencing. For example, when Ellie finds out that she and Carl cannot have children, the tempo of the song slows down to adagio, roughly 70bpm, and when Ellie finds out she is ill, the tempo drops even more (~50bmp). The song ends when the story of their lives together ends (00:11:36). After this emotional sequence of events, Carl's life is about to change in a dramatic way. Throughout his adventures to make Ellie's dream come true, Carl reluctantly befriends a child - Russell - who is an in-training wilderness explorer. Russell changes Carl for the better and throughout their journey to Paradise Falls, and the audience is taken up with them through the repetition of the 4 notes from the main theme song.

Figure 10 shows the notes and melody used to correlate with the relationship between Carl and Ellie. They are played 11 times throughout the film that runs a total of 1 hour and 36 minutes. Each time those notes are played, they evoke an emotional connection to Carl and the love and loss that he feels towards his late wife Ellie. The first four notes of the song (F, A, F, E) are found in 8 songs throughout the film: *We're in The Club Now, Married LIfe, Carl Goes Up, Escape from Muntz, Stuff We Did, It's Just a House, The Ellie Badge, Up with the Credits.*

Table 1 shows every instance that music is repeated. When the same notes repeat, it is always at a significant point in the movie – either Carl escaping from being forced out of his home, escaping from Muntz or rescuing Kevin. The music is also used in moments of pure sadness – Carl reminiscing about his life with Ellie – or it is used in moments of touching happiness – when Carl starts to befriend Russell and is there for him during his wilderness award ceremony.

4.2 Repetition in Horror - Get Out

In true form with a horror genre film, the music is jolting and devastating to the viewer. Composer Michael Abels wrote the score for the film *Get Out*. *Get Out* is a horror film that was released in 2016, about a young black man, Chris, who is taken home to his white girlfriend's (Rose) house to meet her parents. Once he arrives, he realizes that something is not right; all of the people maintaining the house and grounds are black but not only that, they seem to be possessed. Although the score is a compelling part of the film and makes the already heart-racing film more of a nail-biter, I specifically looked at the scene about "The Sunken Place." The Sunken Place is the state of hypnosis that Rose's mother locks Chris into in order to have him lose his consciousness, so that his body can be used to house another person's brain. The high pitched, fast tempo notes are in uniform with the typical horror film soundtrack.

The idea is that the girlfriend's mother, played by Catherine Keener, can perform hypnosis and force someone into "The sunken Place." There, the person can see and understand everything that is going on but does not have any control over their body. Essentially, they are trapped in their body that is now controlled by someone else – someone who has purchased them. When Chris is going into "the sunken place" he does not quite know what is happening to him. Missy (Rose's mom) sits Chris down to talk to him about his smoking habits, but then it starts to get personal. Chris starts to feel paralyzed and emotional over his past – his mother being killed. During the entire conversation, Missy is swirling a spoon around her china tea cup to create a grating sound.

Chris sits down to have a conversation with Missy and at 4 minutes and 30 seconds into the scene, the audience hears the scraping of the spoon against the tea cup 105 times. This sound is a shivering, nails on a chalkboard sound. After about 35 times the audience starts to hear the patter of the rain that Missy is trying to make Chris remember even though he says he doesn't want to think about that night. The rain is not occurring in the actual scene but only in Chris's memory from the night that his mother was killed in a car accident. After about 80 times of hearing the shrill sound of the spoon against the cup, the characters discuss the state of paralysis that Chris feels and due to the repetition of the scraping of the spoon, the audiences feels it too. By the 105th time of hearing the same scraping noise, the viewer is pushed out of reality and into the sunken place. This scene does not have a complex musical score or blaring sounds but alternatively the simple use of sounds and a score consisting of a "harp phrase that evolves into a pattern gradually" (Schweigner, 2017).

The song *Hypnosis* by composer Michael Abels, is the musical accompaniment to the hypnosis scene in the film. This score subtly traps the viewer into feeling that they themselves are being hypnotized. A study shows that shiver-evoking sounds, such as the tea cup and spoon in this scene, activate the amygdala - a part of the brain involved in fearful responses thus heightening activity in the auditory cortex (Kumar, 2012).

Figure 11: Hypnosis: The spoon and teacup used to create the grating, hypnotic sound

4.3 Repetition in Romance - La La Land

Let's take a look at how newely composed music is used in a repetitive nature to establish a theme and emotional connection in *La La Land*. *La La Land* is a Romantic comedy released in 2016. It was nominated for 14 Academy Awards and won 6 - including Best Original Score and Best Original Song for *City of Stars. City of Stars*, written by Justin Hurwitz, is an elegant, entrancing piano piece. This score is played throughout the film in different styles, by different instruments and at various moments in time. The repetitive use of this song is a representation of head-in-the-clouds dreamer Sebastian (played by Ryan Gosling) and extremely talented yet struggling actress Mia's (played by Emma Stone) tangled relationship. The piece is repeated 12 time throughout the film and each time it is used to convey a specific mood and the state of Mia and Sebastian' relationship.

Looking at the first appearance of the song only 16 minutes into the film, Mia has been left by her friends at a party she didn't even want to attend but she did so to network with people who could get her closer to achieving her dreams. As she is left with no way to get home - not even a cab - she starts to walk home on a clear-skied, starry night. As she is walking past a bar - Liptoris - she hears the piano playing which strikes her attention enough to derail her adventure home. Curious as to where the music is coming from, she enters the bar and for the second time lays her eyes on Sebastian. The scene cuts to the flashback of an altercation her and Sebastian were involved in earlier that day. When he finished playing, he gets up and walks right past her without saying a word even though she is trying to get his attention. This scene in particular is incredibly important because it established the dynamic between the two, the unsuspecting romance, and the realization that they need to be apart to realize their dreams.

This scene is repeated at the end of the film when either Mia or Sebastian or both are imagining what their life would be like if things had gone differently. Except instead of Sebastian walking away past Mia, he grabs her and kisses her. From 1:55:00 to 1:58:29 into the movie, their life together flashes across the screen; getting married, buying a house, having kids, going out on a date that would

ultimately bring them to the same bar. An orchestral version of the song plays at an allegro tempo creating a bright, happy future for Sebastian and Mia. When the audience is brought back to reality - that they are not together and they never will be - then the song goes back to the slow, adagio tempo piano solo jolting the audience into the pain and loss that they feel over what could have been.

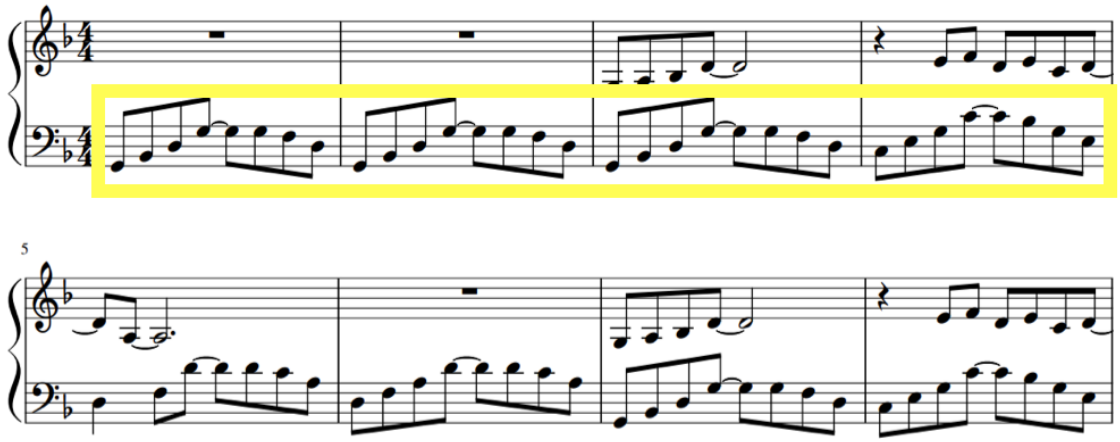

Figure 12: La La Land – "City of Star"s composed by Justin Hurwitz
Looking only at the base clef – the notes go G, B major, D, G, then back down G, ,G, F, D then it goes up an octave higher after repeating three times to C, E, G, C, C, B .

Every time *City of Stars* is played in La La Land, it is used to connect Sebastian and Mia together. It is played during the introduction of their romance, during the struggles that they feel being apart in pursuit of their dreams, the pain when they don't end up together and the fantasy of what could have been. These emotions are all connected through the repetitive use of the song *City of Stars*.

4.4 Repetition in Action - Inception

Inception is a science fiction heist film released in 2010. The film is about a thief Dom Cobb, played by Leonardo DiCaprio, who has the ability to infiltrate people's dreams, or subconscious, in order to manipulate them into revealing their secrets or the whereabouts of precious possessions. Cobb is tormented by his past; his wife, Mal played by Marion Cotillard, killed herself because she believed that she was not in her reality and if she jumped, she would make it back to reality. Typically jolting yourself back into reality happens when you kill yourself in a dream but sadly, she ultimately ended her life. She framed Cobb for her murder because she was convinced it was the only way to get him to go with her. Because he was on the run, he was unable to be with his children and takes an offer - a dangerous offer - that would rid him of his crimes and bring him home; back to reality. Cobb compiles a team to help him achieve his mission: Arthur, his original partner in crime, Eames, another known inception criminal, Ariaden, an architect student that he recruits to build the levels since Mal is preventing him from creating levels that she won't incept, Saito, Cobbs original target to in turn offers him this opportunity. This team is assembled to incept Fischer's, son of businessman millionaire, mind to plant the idea to sell his father's company when he dies.

Given the nature of the film, the music and sounds play a crucial part in giving the viewer the feeling like they are in a dream-like state. The same song is used throughout the film - *Non, Je ne Regrette Rien* by Edith Piaf. The song was released in 1960 and translates to, "No, I do not regret anything." The theme of regret or trying to achieve no regrets, plays throughout the film as well. DiCaprio's character deeply regrets ever trying to plant a thought into his wife's brain, which he believed eventually pushed her over the edge. Not only is Edith Piaf's song played throughout the film, but elements of the song were also used to construct the score ("braam" sound) that is also used in the film. When Cobb and his team penetrate someone else's dreams, they use that song as a sign that they are about to run out of time in the "under" reality. By repeating this song, the viewer gets the same sense of unease knowing that time is running out for the characters to achieve their mission. It is also a romantic sounding song with a moderately slow tempo which draws the romantic connection to Cobb and Mal, intensifying the notion that his irrational decisions are because of his love for her.

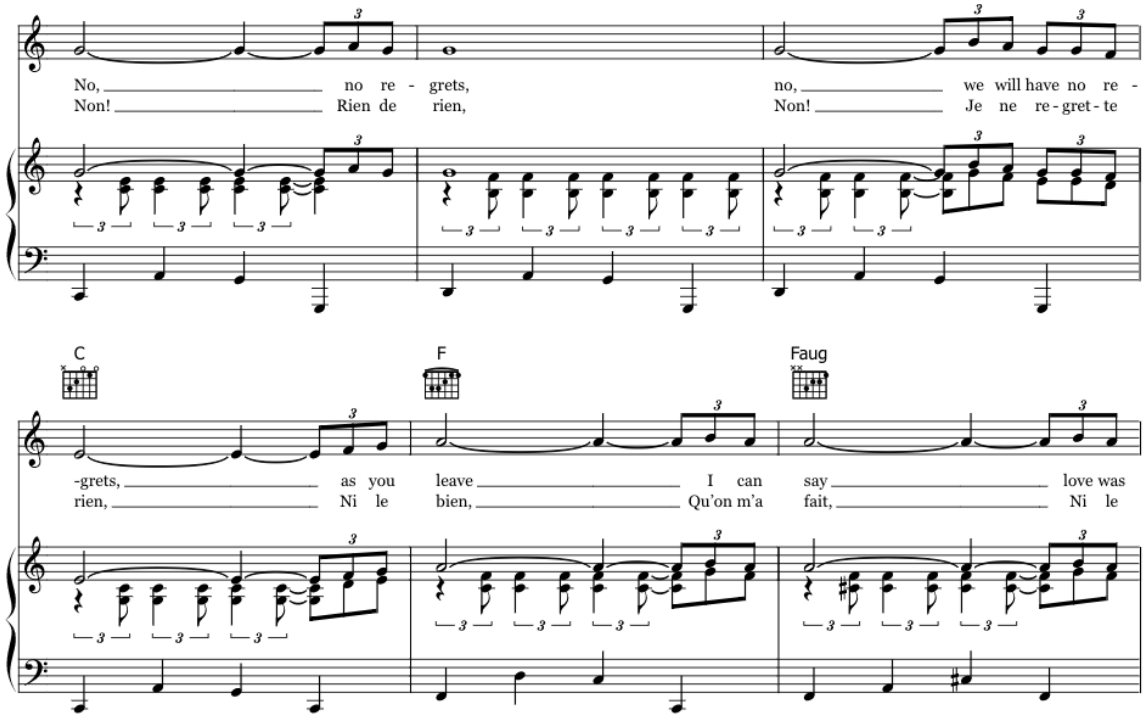

Figure 13: 2nd and 3rd lines from Non, Je ne Regrette Rien by Edith Piaf

The film score composer, Hans Zimmer, is famous for his talent in pulling emotion through his pieces of music. In the instance of *Inception* he incorporates the main theme song in his scores that ring throughout the film. "Just for the game of it, all the music in the score is sub divisions and multiplications of the tempo of the Edith Piaf track. So I could slip into half-time; I could slip into a third of a time. Anything could go anywhere. At any moment I could drop into a different level of time." (Zimmer). He is able to take an elegant piece and by slowing down the tones, turn it into an ominous sound. The reverberation of the song changed depending on what level of reality the characters are in. In times of panic and drama, there are a few thunderous, foghorn-like notes that are played over and over,

called “Braams” in Hollywood. Zimmer constructed the score “from a single manipulated beat from [Edith Piaf’s song]” (Itzkoff, 2010). The first two notes of the song use a trombone to give the brassy edge. These two notes of the second line (shown in *figure 13*) are the tones that Zimmer used to create this particular score (*Mind Heist*) for the film. When the audience hears the brassy “horn” sound it is derivative of the trombone tone at the beginning of the song. In the course of 2 hours and 28 minutes, the audience hears the song 12 times and the derived tone 19 times.

The use of the *Non, Je ne Regrette* for this film is an interesting choice in that it a beautiful, French song with a moderately upbeat tempo (86 bpm). However, because the song is used repeatedly as a means to indicate that time is running out, when the audience hears the song it creates a sense of anxiety and unease. Additionally, the “braam” tones that were constructed by manipulating the song, have a powerful impact on the viewer’s sense of urgency and panic.

CHAPTER 6: Conclusion

When the song *Can’t Take My Eyes off of You* starts playing in a restaurant, the radio, the television, or wherever, I am immediately reminded of the most romantic presentation of love and endearment in any 90’s film (in my opinion). *10 Things I Hate About You* was released in 1999 and was the romantic comedy that I grew up watching on repeat. Heath Ledger and Julie Styles play love interests Patrick and Katarina. Against all odds – mostly because of Katarina’s aggressive attitude towards life – they actually fall in love. In order to win her trust and affection, Patrick sings, *Can’t Take My Eyes off of You* to Kat in front of the entire school. Almost 10 years later and I am brought back to the idealistic high school romance and the love that felt like it would never end. Music has been a means of telling a story for centuries and has the ability to transport you to a specific moment in time. The inclusion of music in moving pictures adds an emotional and memorable layer to the narrative of the film. Audio Post-production is a complex process that requires the use of immense creativity and a keen eye. Music and sounds play a large role in evoking particular emotions because music has been linked to memory it has a very powerful impact on one’s emotions or memories affiliated with a song. The way we feel about a certain instance is what drives our actions, experiences and memories. In a state of fear, we find that we do things subconsciously and there is no real thought around what we are doing. In a state of sadness, we comfort ourselves with things that we love; Ben and Jerry’s ice-cream or “punny” memes. In a state of happiness, the euphoria is infection and we want everyone to feel the same way that we do and we float around without a care in the world. Our perception of the world is driven by how we are *feeling*. Experiencing the narrative of a film is no different in terms of practice but the biggest difference lies with who and how the emotions are being brought to our attention. Using musical repetition in film is a strong way to hammer in a feeling and drive it home through the reuse of that piece. Without music in film, our emotional connection to the viewer would be lackluster. Repetition in music elicits a physiological response and triggers past experiences and memories.

APPENDIX

I. List of Figures and Tables

II. Research Tables & Analysis

A. Up

Score: Repeated melodies				
Soundtrack Title	**Time played**	**Music Tempo**	**Metronome**	**Events**
"We're in the Club Now"	00:04:42	Moderately slow	q = 88	The opening scene young Carl finds young Ellie playing an airplane captain, same as him. Ellie is talkative while Carl stays silent.
"Married Life"	00:07:31	Presto	q = 178	Life montage (in discussion)
"Married Life" Slow, piano version part of the song	00:19:37	Moderately slow	q = 70	Carl is sitting his in chair (next to Ellie's) where they used to read side-by-side. Carl is looking through the adventure book the night before he is going to be forces out of the house he spent his life in; the house will all his memories with Ellie.
"Carl Goes Up"	00:21:55	Moderately	q = 108	Carl refuses to be forced into a retirement home. He spends his night filling the house with helium balloons - enough to lift him and the house up. Carl released the balloons and away he goes to fill Ellie's dream of making to Paradise Falls.
"Escape from Muntz Mountain"	01:00:54	Thrilling, string ostinato	q = 180	Carl and Russell are running away from Muntz who is trying to capture Kevin for a prize. Carl and Russell are saving Kevin but need to escape from Muntz and his trained dogs.
"Stuff We Did"	01:12:08	Slowly, expressively	q = 60	After the house crashes, Carl is picking up the pieces of his house and putting his and Ellie's chair back next to one another. While he is cleaning up his house, he finds Ellie's

				Adventure book. The music does not play until Carl is flipping through the book and gets the to the page "Stuff I'm Going to do." As he goes to close the book he realized that some of the proceeding pages have been filled. At this moment the music begins to play while Carl flips through the remaining page and realizes that Elle filled the rest of the book with photos of their lives together.
"It's Just a House"	01:14:43	Slowly, expressively	q = 60	Russell leaves Carl to go find Kevin. Carl wants to help the kid so he empties his entire house so that the house will become light enough to float from the balloons.
"It's Just a House"	01:26:41	Slowly, Uplifting	q = 60	Carl and Russell successfully saved Kevin and his children. Then Carl and Russell set off to head back home.
"The Ellie Badge"	01:27:44	Moderately slow	q = 86	Carl attends Russell's wilderness explorers meeting and awards Russell with the 'Ellie Badge" for assisting the Elderly and performing above and beyond the call of duty. (senior wilderness explorers)
The Ellie Badge (cont).	01:28:18	Moderately slow	q = 86	Carl and Russell are playing a game together (pointing out car colors while eating ice-cream)
Up with the Credits (End Credits)	01:29:02	Moderately fast, Waltz	q = 116	Up with the Credits (End Credits)

Table 1: Each song in which the same notes are used, the tempo changes of the songs, and the instance at which they are played.

B. La La Land

Song: City of Stars		
Time played	**Instruments**	**Meaning**
00:16:00	Piano	First emotional connection between Mia and Sebastian when Mia finds Sebastian playing City of Stars in a club.
00:23:40	Piano	Now the viewer in 23 minutes into the film and is hearing the song for a second time. This time we are seeing the day from Sebastian's point of view. From, Sebastian's perspective of that moment - he is playing in the club because it is his dream and his passion to own his open Jazz club and play music.
00:42:14	Guitar	Ryan finds Emma at her work on the Hollywood set where they go on their first "date" getting to know each other as they walk through film sets.
00:46:23	Piano, whistling, singing	Their come to an agreement that they will go see a film at the rialto to help her with her upcoming audition. The notes of the song ring in the background. The scene leads into the first sung lines of the song. This piece is a solo of Ryan Gosling singing the words, "City of stars,
00:51:30	Piano	When Mia is out to a last minute dinner with her boyfriend (Greg) and his brother and girlfriend – she is overcome with boredom and sadness of listening to this group of pretentious people. Suddenly, she is lifted out of the dullness when she hears the melody start to play over the speaker.
01.08:46	Piano, singing, harmony	A "jazzed-up" version of the song is played by Sebastian. Then it goes into the duet version of the song. This time the audience hears more of the song and Mia harmonizes with Sebastian. This becomes a song of love and turns into the overlaying song of them both pursuing their

		dreams. The scene ends at 1:14 with the song coming full circle.
01:17:46	Jazzy piano, faster tempo	She hasn't seen Sebastian in a while since he took the job in a band and has been on tour. The melody is faster and evokes excitement.
01:27 :17	Piano, slow tempo	During the photoshoot – the photographer asks him to play something while he take candid shots. He starts playing the 4 notes of *City of Stars*.
01:50:35	Piano, moderately	First time the audience hears Sebastian playing at the club he ends up opening. The characters and the audience are transported back to the moment where Mia first hears Sebastian playing but instead of him brushing her off – he kisses her and they dance into their future together.
01:54:55	Orchestra transition into Trumpet solo	Rewind to the beginning of their relationship; the start of what could have been different.
01:56:33 – 01:58:18	Piano, adagio	Slower, solo piano version plays while they watch a home video of what their live would have been. Getting married, starting a family, moving into their new home, they would be the ones to leave the child with a babysitter to go on a date and stumble across the new jazz club.
01:59:25	Flute, adagio	Flute version of the song starts playing when they look at each other one last time.

Table 2: The repetition of music keeps the viewer engaged in the story and emotionally connected to it.

C. Inception

Soundtrack: Non, je ne Regrette Rien & Score: Derived from song, dramatic brass tones (-70%)		
Time played	**Music Type: "Braam" or Song**	**Meaning**
Opening credits	Braam	Extreme slowed down version of the first few notes of Non, je ne Regrette Rien (Ostinato – 16 times)
00:08:18	Braam	Twice – When Cobb realizes that Mal sold him out on his mission to steal from Saito
00:09:22 – 00:09:50	Braam	The dream is starting to crumble and Cobb and Arthur are trying to escape
00:12:13	Braam	Two notes – Cobb is trying to figure out why Saito let them into his subconscious if he knew they were coming at all
00:12:57	Song	First time the song is used to pull characters out from a dream. It continues to echo through the scene for almost a minute (until 00:13:47)
00:14:07	Song	The audience is shown the tape player that the song is coming from and the first lines starts the play again
00:14:30	Song	Echoing in the background of the dream level for 15 seconds (until 00:14:45)
00:28:13	Braam	Cobb is recruiting Ariadne to build the levels of the dream for their next mission. To show Ariadne how inception is possible, Cobb builds a dream level to show her and when they are about to be pulled out of the dream, the score begins.
00:28:19	Song	Ariadne is pulled out of her first experience in inception and wakes to the song
00:53:17	Song	The team is experimenting with the new drug that will put them under so they can go two levels down. They are practicing ways to synchronize the "kick" that will pull them out of the dream. They decide to use

		"the musical content" to help them achieve this.
01:38:37 – 1:40:00	Braam	Cobb and his team has successfully incepted Fischer's dream. But on the upper level, the team is being attacked therefore it is causing their reality to shatter. During the scene, Arthur is fighting off attackers from the first dream level while the rest of the team continues to the second level.
01:42:56	Song	Yusuf – who is the driver and chemist of the operation – starts to play the song to start the synchronized kick that will pull them back to reality.
01:43:05	Song	The song is being heard on the first level of inception. Arthur is listening to the echoing version of the song and panicked that time is running out.
01:45:07	Braam	The song transitions into the score to intensify to urgency of this moment.
01:43:15	Song	The song is echoing down to the second level of inception. Indicating that they have 10 seconds from the kick in reality, 3 minutes from the kick in the first level of inception and, 60 minutes in the second level.
01:45:00	Braam	Ostinato plays while the team is being attacked on the second level of inception.
01:45:11	Song	Arthur is fighting off attackers in the first level of inception. The song is echoing in the background as a reminder that time is running out.
1:45:13	Braam	The score begins to play. The ostinato of the two notes rings through 6 times before the van that holds the unconscious team begins to fall off the bridge.
01:47:41	Braam	The team is struggling on both levels since they missed the first kick (smashing into the barriers of the bridge). They now only have the second kick to get back to reality.
01:48:41	Braam	Arthur is trying to figure out a way to "drop" his team to create a kick on the first level, however, he needs a way to do it without gravity since he is in a dream.

01:52:24	Braam	Mal shows up in the dream. Cobb has his sights on her but is unable to shoot so Mal gets the chance to shoot Fischer. When Cobb finally pulls the trigger and hits Mal, the "braam" begins. It continues to play until 01:53:26 when Cobb tells the team that since Fischer was shot, his mind his trapped and they failed their mission. At this moment, all music stops.
01:54:56	Braam	Cobb and Ariadne have to go down one more level to try and salvage their mission. When they hit the next level of inception, the brassy-tone begins.
02:03:19	Braam	Cobb is finally telling Ariadne how he knew that you can incept an idea into someone's mind; because he had done it to Mal.
02:05:40	Braam	Even after finding out the truth, Mal is trying to convince Cobb to stay with her in the world that they built together. The shot goes to the van that is still falling in slow motion but is getting closer to hitting the water and created the second "kick" out of inception.
02:06:31	Song	Arthur has strung his unconscious team together and is putting them in an elevator that he will blow up to create a kick on the first level of inception. He plays the song to start the countdown.
02:06:45	Song transition into Braam	The song is played on the second level of inception and transitions in the score. The "braam" song plays in ostinato while Eames rushed over to Fischer to use the defibrillator to "kick" him back to the second level. Then it rings down to the third level for Cobb and Ariadne to hear.
02:08:32	Braam	Cobb tells Mal that he can't stay with her and insults her in the process. She goes to stab him and then Ariadne shoots Mal.
02:08:41-02:08:14	Braam	While Ariadne pushed Fischer to kick him back to the second level, Eames uses the defibrillator to kick him out simultaneously. Arthur, on the first level, hits the detonator to blow up the elevator to create a kick on the first level. The scene cuts to the shot of van still

		falling but getting closer to hitting the water.
02:11:00 – 02:12:37	Braam	Osinato for 1 min 37 seconds then fades into song (Non, je ne regrette rien). During this time each member of the team is trying to kick back into the different levels of inception. Arthur blows up the elevator, Eames blows up the hospital, Yusuf crashed the van into the water.
02:12:27	Song	A snippet of the song echoes as the van hits the water

Table 3: Chart For the purposes of the study, charted are each instance in which "Non, Je ne Regrette Rien" and the "Braam" score are played throughout the 2 hours and 28 minutes of film.

Bibliography

Anderson, A. (2014, September 2). Why we love repetition in music - Elizabeth Hellmuth Margulis. Retrieved April 9, 2018, from https://ed.ted.com/lessons/why-we-love-repetition-in-music-elizabeth-hellmuth-margulis

Arias, M. (2014, June 8). Music and the brain: Neuromusicology. Retrieved April 13, 2018, from http://nah.sen.es/en/issues/lastest-issues/137-journals/volume-2/issue-4/282-music-and-the-brain-neuromusicology

Baker, M. (2007, August 08). Music moves brain to pay attention, organize events. Retrieved April 4, 2018, from https://news.stanford.edu/news/2007/august8/med-music-080807.html

Berman, R. (2017, May 30). Watch How a Single Sound Effect Can Transform a Movie. Retrieved May 2, 2018, from http://www.slate.com/articles/video/video/2017/05/how_a_single_sound_effect_can_transform_a_movie_video.html

Bruner, G. C. (1990, October). Music Mood and Marketing. Retrieved April 9, 2018, from https://www.scribd.com/doc/211042223/Music-Mood-and-Marketing

Bhattacharya, S. (2017, October 24). Movies and music play with our minds by bending time. Retrieved April 11, 2018, from https://horizon-magazine.eu/article/movies-and-music-play-our-minds-bending-time_en.html

Burunat, I., Alluri, V., Toiviainen, P., & Brattico, E. (2014, May 09). Dynamics of brain activity underlying working memory for music in a naturalistic condition. Retrieved April 13, 2018, from https://www.sciencedirect.com/science/article/pii/S0010945214001270?via=ihub#fig5

Copland, A. (2011). *What to listen for in music*. Penguin Putnam.

Craig, S. (2012, April 13). How Music can Change a Film. Retrieved April 19, 2018, from https://www.youtube.com/watch?v=rn9V0cN4NWs&t=120s

Davidson, M.; Heartwood, K. (1996). *Songwriting for Beginners*, p.6. Alfred Music Publishing.

Editors, A. (2016). Neuromusicology. Retrieved April 3, 2018, from https://www.accessscience.com/content/neuromusicology/BR0224161

Eerola, T., & Vuoski, J. K. (2013, February 01). A Review of Music and Emotion Studies: Approaches, Emotion Models, and Stimuli. Retrieved April 19, 2018, from http://www.jstor.org/stable/pdf/10.1525/mp.2012.30.3.307.pdf?refreqid=excelsior:06a7b6e329ad8fb243d210c6b222d79e

Garfias, R. (2004). Music: The Cultural Contex. *Senri Ethnological Reports*. Retrieved April 19, 2018, from http://www.socsci.uci.edu/~rgarfias/aris/bio-research/SER47_Robert Garfias.pdf

Gorbman, C. (1980). Narrative Film Music. Retrieved April 19, 2018, from http://www.jstor.org/stable/pdf/2930011.pdf?refreqid=excelsior:33a80e30b7f9be9aa975e52ba89a12b7

Grewe, O., Nagel, F., Kopiez, R., & Altenmüller, E. (2007). Listening To Music As A Re-Creative Process: Physiological, Psychological, And Psychoacoustical Correlates Of Chills And Strong Emotions. *Music Perception: An Interdisciplinary Journal,24*(3), 297-314. doi:10.1525/mp.2007.24.3.297

Grahn, J. (2013, May 30). Music on the Brain: Jessica Grahn at TEDxWaterloo 2013. Retrieved April 2, 2018, from http://www.youtube.com/watch?v=u1vlTI0EsPk

Hossain, A. (2015). Re-Evaluating Music-Art-Sound of Film through Aestheticism. *American Research Journal of English and Literature*. Retrieved April 9, 2018, from https://www.arjonline.org/papers/arjel/v1-i3/4.pdf.

Itzkoff, D. (2010, July 28). Hans Zimmer Extracts the Secrets of the 'Inception' Score. Retrieved April 4, 2018, from https://artsbeat.blogs.nytimes.com/2010/07/28/hans-zimmer-extracts-the-secrets-of-the-inception-score/.

Landry, K. (n.d.). Kyle Landry "Married Life (from "Up")" Sheet Music (Piano Solo) in F Major - Download & Print. Retrieved April 21, 2018, from https://www.musicnotes.com/sheetmusic/mtd.asp?ppn=MN0170503

Levitin, D. J. (2016). *This is your brain on music: The science of a human obsession*. New York, NY: Dutton.

Margulis, E. H. (2014). *On repeat how music plays the mind*. New York: Oxford University Press.

Logeswaran, N., & Bhattacharya, J. (2009, March 17). Crossmodal transfer of emotion by music. Retrieved April 4, 2018, from https://www.sciencedirect.com/science/article/pii/S0304394009003279?via=ihub

Margulis, E. H. (2013, March 17). Repetition and Emotive Communication in Music Versus Speech. Retrieved April 3, 2018, from http://www.frontiersin.org/articles/10.3389/fpsyg.2013.00167/full

Maher, M. (2016, March 19). Foley: The Art of Making Sound Effects. Retrieved April 2, 2018, from http://www.premiumbeat.com/blog/art-of-making-sound-effects/

McGilchrist, S. (2011, January 09). Music 'releases mood-enhancing chemical in the brain'. Retrieved April 13, 2018, from http://www.bbc.com/news/health-12135590

Meyer, L. B. (1999). *Music, the arts and ideas: Patterns and predictions in twentieth century culture*. Chicago: Univ. of Chicago Press.

Neumeyer, D. (2015). *The Oxford handbook of film music studies*. New York: Oxford University Press.

Orlowski, M. (2015). What Is Audio Post Production. Retrieved April 12, 2018, from http://www.mpse.org/what-is-audio-post-production

Patel, A. (2015, March 10). Neuroscientist Talks Music's Effects on the Brain. Retrieved April 13, 2018, from http://www.youtube.com/watch?v=W6GI2vpCrbM

Schweiger, D. (2017, March 7). Interview with Michael Abels. Retrieved May 1, 2018, from http://www.filmmusicmag.com/?p=17235

Science, The. (2017, September 05). Retrieved April 4, 2018, from https://www.playlistforlife.org.uk/the-science

Shorr, A. (2012, April 19). Unlocking music with neuroscience | Ardon Shorr | TEDxCMU 2012. Retrieved April 1, 2018, from http://www.youtube.com/watch?v=cswhOCKQZ7Q

Wilkins, R. W., Hodges, D. A., Laurienti, P. J., Steen, M., & Burdette, J. H. (2014, August 28). Network Science and the Effects of Music Preference on Functional Brain Connectivity: From Beethoven to Eminem. Retrieved April 14, 2018, from http://www.nature.com/articles/srep06130