

# **Emotionally-Induced Digital Music Streaming Behaviors: A Look into the Emotional Drivers of Consumer Decision-Making in Song Selection**

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Bachelor of Business Administration in

Event Management

Submitted to Reinhard Vock

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Vienna, 31<sup>st</sup> of May, 2023

## **Affidavit**

I hereby declare that I am the sole author of this Bachelor's Thesis. I have used no sources and aids other than those indicated. All passages quoted from publications or paraphrased from these sources are properly cited and attributed.

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## Abstract

Listening to music may seem like a random, habitual activity to some, yet research is beginning to suggest that individuals alter their preference for music subconsciously based on their emotional state. The digital music streaming industry is growing exponentially and the need to keep up with consumer value expectations is increasing. This project seeks to establish a better understanding of emotionally-induced streaming intentions and selections of music listeners. The research population of interest is Western, Generation Z, university student, music listeners. Two outcomes of emotionally-induced music decision-making are analyzed: playlist selection and song selection. The four basic human emotions (BHEs) of sadness, anger, fear, and happiness are examined in listeners as effect variables with respect to listener playlist selection and song selection. Data collection was conducted in an interview setting with auditory emotional stimuli to assist participants in recalling these four BHEs. In each emotional category, participants made emotionally-primed playlist selections, short-clip selections, expressed short-clip skipping intentions, and open-ended song selections. The intention for the playlist selection was to determine if individuals select emotionally-primed playlists with the intention of emotional regulation or alteration. Emotional preference for the musical characteristics of tempo, mode, and rhythm were also analyzed. Conclusions were drawn for each emotion individually. Individuals experiencing a sad emotion intended to regulate their music by listening to slow songs with a strong rhythm. Individuals experiencing anger attempted to regulate their emotion by listening to fast songs with a weak and unpredictable rhythm. Individuals experiencing fear aimed to alternate their emotion while listening to slow, major songs with a strong and predictable rhythm. Individuals experiencing a happy emotion sought emotional regulation by listening to fast, major songs with a strong and predictable rhythm. The findings from this research will help improve digital music streaming suggestion algorithms by better understanding how BHEs and emotional preferences influence streaming playlist selection and song selection.

**Keywords:** Basic Human Emotions (BHEs), Streaming Intentions, Streaming Selections, Digital Music Streaming, and Emotional Regulation

## Table of Contents

<b>Affidavit</b>	<b>2</b>
<b>Abstract</b>	<b>3</b>
<b>List of Tables</b>	<b>6</b>
<b>1 Introduction</b>	<b>7</b>
1.1 Research questions: .....	<b>8</b>
<b>2 Literature Review</b>	<b>9</b>
2.1 General Emotional Intentions in Music Streaming .....	<b>10</b>
2.1.1 “Sadness” .....	11
2.1.2 “Anger” .....	11
2.1.3 “Fear” .....	12
2.1.4 “Happiness” .....	12
2.2 Emotional Primes Influencing Streaming Intentions .....	<b>12</b>
2.2.1 Emotional Priming through Colors .....	15
2.3 Emotionally Induced Streaming Intentions Based on Song Characteristics 17	
2.3.1 Emotional Cues of Musical Tempo .....	18
2.3.2 Emotional Cues of Musical Modality .....	20
2.3.3 Emotional Cues of Musical Rhythm .....	21
2.4 Research Model .....	<b>22</b>
<b>3 Methodology</b>	<b>22</b>
3.1 Study Design .....	<b>23</b>
3.2 Survey Development & Measures .....	<b>24</b>
3.3 Limitations .....	<b>29</b>
<b>4 Results &amp; Analysis</b>	<b>30</b>
4.1 Sadness .....	<b>30</b>
4.1.1 “Sadness” Playlist Selection .....	31
4.1.2 “Sadness” Piano Clip Selection .....	32
4.1.3 “Sadness” Piano Clip Skipping .....	33
4.1.4 “Sadness” Song Choice .....	33
4.2 Anger .....	<b>34</b>
4.2.1 “Anger” Playlist Selection .....	35
4.2.2 “Anger” Piano Clip Selection .....	35
4.2.3 “Anger” Piano Clip Skipping .....	36
4.2.4 “Anger” Song Selection .....	36
4.3 Fear .....	<b>37</b>
4.3.1 “Fear” Playlist Selection .....	38
4.3.2 “Fear” Piano Clip Selection .....	39
4.3.3 “Fear” Piano Clip Skipping .....	39
4.3.4 “Fear” Song Selection .....	40
4.4 Happiness .....	<b>41</b>
4.4.1 “Happiness” Playlist Selection .....	41

4.4.2	“Happiness” Piano Clip Selection .....	42
4.4.3	“Happiness” Piano Clip Skipping .....	43
4.4.4	“Happiness” Song Selection .....	44
<b>5</b>	<b>Conclusion</b>	<b>44</b>
5.1	Sadness .....	45
5.2	Anger .....	46
5.3	Fear .....	47
5.4	Happiness .....	48
5.5	Recommendations for Future Research .....	49
<b>6</b>	<b>Bibliography</b>	<b>51</b>

## List of Tables

<i>Table 1: Auditory Emotional Stimuli</i> .....	26
<i>Table 2: Playlists</i> .....	26
<i>Table 3: Musical Characteristics of Clips</i> .....	27
<i>Table 4: Piano Clip Titles</i> .....	28

## 1 Introduction

The digital music streaming industry has been growing consistently over the past several years and is predicted to reach 1 billion users by 2025 (Statista, 2022). With such a large number of users, digital streaming platforms will need to find new strategies to keep pace with consumers' value expectations. Digital streaming platforms have already started developing value enhancement through digital music streaming suggestion algorithms that recommend songs to users based on collected data (Maasø & Hagen, 2019). Streaming algorithms have been designed to suggest songs to users based on rudimentary variables such as streaming history, demographics, and song popularity (Maasø & Hagen, 2019). This study seeks to determine if basic human emotions (BHEs) influence streaming decisions in Western society Generation Z university student listeners; this specific demographic has the largest number of digital streaming users (Khanna et al., 2022). Furthermore, this study will focus on individuals that listen to at least one of the top six most digitally streamed genres of music: pop, rock, the 90s, the 80s, soundtracks, and/or hip-hop/rap/trap (Susic, 2023).

Emotion has been found to have an association with music streaming (Juslin & Västfjäll, 2008). Users generally stream music for emotional regulation (Juslin & Laukka, 2004); however, researchers have yet to thoroughly test for a specific correlation between an individual's pre-listening BHEs and streaming intentions and selections based on how individuals perceive the emotional effect of a song. Past studies have shown results implying this correlation, but not considering consumer purchasing (streaming) intentions and selections.

Users of digital music streaming platforms are influenced by emotions as certain types of music are sought for emotional regulation. Furthermore, streaming decisions are influenced by the intention of emotional alteration.

Studies have found that users who stream music for personal motives do so to gratify “emotional needs” (Randall & Rickard, 2016). Randall and Rickard (2016) determined that users are influenced by negative emotions (such as sadness or anger) when streaming music for personal reasons. Although this suggests that individuals are influenced only by negative BHEs when choosing to listen to music, further research shows that users value music listening for “positive emotional experiences” and outcomes (Saarikallio et al., 2020). Research has also demonstrated that streaming decisions are influenced by emotional regulation (Juslin & Laukka, 2004), implying that song selections can reflect the current BHEs of listeners. This might be interpreted to mean that listeners make music streaming decisions in alignment with current emotions, positive or negative.

This study will focus on the effect that pre-listening BHEs have on streaming intentions and selections. The findings will contribute to the understanding of the association between music streaming behavior and BHEs. First, the study will seek to explain the relationship between pre-listening BHEs and a user’s intention to stream music based on the perceived emotional effect of a song (i.e., presenting a sad listener with a playlist entitled, “sad songs”). Secondly, the research will seek to explain a correlation between pre-listening BHEs and streaming selections based on basic song characteristics (i.e., a sad listener choosing to keep listening to a song based on pre-defined “sad” song characteristics such as minor mode or slow tempo). The findings will help digital music streaming platforms better understand the emotionally-induced music selection process.

### **1.1 Research questions:**

RQ 1: What is the association between pre-listening basic human emotions and music streaming decisions based on perceived emotional effect?



RQ 2: What is the association between pre-listening basic human emotions and music streaming decisions based on the basic song characteristics of tempo, mode, and rhythm?

## 2 Literature Review

The associations between basic human emotions (BHEs) and music listening have been studied. Basic human emotions are the standard base classifications of everyday emotions (Shaver et al., 1987), and have been shown to drive music streaming intentions and selections (Juslin & Västfjäll, 2008). This study focuses on four basic emotions: happiness, sadness, anger, and fear. Various cultures understand emotions differently (Shaver et al., 1987); however, as Western Culture has the largest number of digital music streamers (Khanna et al., 2022) this study focuses on the understanding of emotions in Western cultures. Age also has an impact on general emotional perception (Eerola & Vuoskoski, 2013). Generation Z comprises the largest demographic of digital music streamers (Khanna et al., 2022); although it is recognized that Generation Z is a very large population with many, varied sub-groups.

Academic literature has reported correlations between BHEs in Generation Z music listener streaming intentions. Listeners of Generation Z stream music partly with the intention of emotional regulation (Juslin & Laukka, 2004), suggesting that listeners select music based on their perceived emotional effects. Music listeners have a perception of the emotional effect of music (Mohn et al., 2010), and perception can be used as a proxy measure of emotional regulation. Music helps listeners regulate emotions (Juslin & Laukka, 2004), which infers an association between the listener's pre-listening BHEs and the perception of the emotional effect of a song. This indicates an association between the listener's pre-listening BHEs and song *characteristics* of the emotionally-induced song selection. (The term

“characteristics” is presented in italics to represent the specific set of musical characteristics being studied.) Indeed, the perception of the emotional effect of a song is driven by the basic *characteristics* of a song (Eerola & Vuoskoski, 2013; Fritz et al., 2009). The two basic song *characteristics tempo* and *modality*, correlate well with emotional perception (Balkwill et al., 2004), while *rhythm* adjusts the strength of emotional influence of a song (Scherer & Coutinho, 2013); this provides further evidence of an association between pre-listening BHEs and selected song *characteristics*.

The BHEs of happiness, sadness, anger, and fear conveyed through music were initially believed to be universally recognizable by music-listening consumers (Eerola & Vuoskoski, 2013; Fritz et al., 2009). More recent studies, however, have found that anger and fear are not universally recognizable by music-listening consumers (Argstatter, 2015). A possible explanation for anger and fear not being universally recognizable through music listening is that earlier research suggests these emotions are more difficult to perceive when compared to happiness and sadness (Terwogt & Grinsven, 1991). Eerola and Vuoskoski (2013) demonstrated that the recognition of BHEs in music depends upon demographic variables, such as age and geographic origin. Argstatter (2015) focuses on universal cues amongst cultural differences, whereas Eerola and Vuoskoski (2013) include a broader approach including age demographics. This study is including both anger and fear since the aim of the study is not to determine how listeners emotionally perceive a song, but rather to determine the association between experienced pre-listening basic emotions and song intentions and selections.

## **2.1 General Emotional Intentions in Music Streaming**

Individuals listening to music while experiencing a certain emotion may intend to approach their emotions differently, depending on the emotion. Juslin & Laukka (2004) show that individuals listen to music for emotional

regulation based on their own subjective emotions and subjective emotional perception of a song. This section will look at the types of music individuals seek when they are experiencing certain emotions based on their own emotional perception of a song.

### **2.1.1 “Sadness”**

Individuals feeling sad have been found to lean more toward selecting subjectively sad songs (Van Den Tol & Edwards, 2013). This indicates that sad listeners seek to regulate this emotion. Van Del Tol and Edwards (2013) found that individuals seek to listen to sad music when feeling sad because it helps them self-regulate the emotion. Although it might seem counterproductive to listen to sad music while feeling sad, Van Del Tol and Edwards (2013) note that sad listeners might eventually improve their emotions into positive and happier emotions when listening to sad songs. However, listeners who choose subjectively happy-sounding music while sad with the intention of making themselves happy have been found not to end up making themselves happier (Schooler et al., 2003). Regardless of intentions or outcomes, it appears that listening to subjectively sad music while experiencing sadness is commonplace.

### **2.1.2 “Anger”**

Those experiencing anger have been found to sometimes listen to angry music (Sharman & Dingle, 2015). This would indicate that listeners might seek to regulate their anger when making digital music streaming selections. Sharman & Dingle (2015) determined that when angry listeners stream music they perceive as angry music, it does not escalate their emotions, but rather matches their emotions. This has been shown to eventually lower their anger and redirect it into a more positive emotion (Sharman & Dingle, 2015).

### **2.1.3 “Fear”**

People experiencing fear, or anxiety, tend to listen to music for the purpose of altering their emotions to more relaxed states (Elliott et al., 2011).

Increasing fear while in a state of fear has not been found to eventually lead to more positive emotions, as it was with anger and sadness. In this study, music that was controlled and predictable, soft, and slow tended to be the most relaxing songs (Elliott et al., 2011). Furthermore, Elliott et al. (2011) found that individuals lower their fear when listening to calm and relaxing music. It can be said that anxious or fearful individuals will listen to relaxing music to alter their emotional states to more positive emotions.

### **2.1.4 “Happiness”**

Individuals experiencing happiness seek to maintain this emotion and regulate it by listening to subjectively happy music (Saarikallio, 2011). The dominant factors in song selection when listeners are feeling happy are the basic music *characteristics*, rather than other characteristics such as lyrics (Mori & Iwanaga, 2014). Additionally, Mori & Iwanaga (2014) found that sad lyrics may generate positive feelings, even when the individual is happy, and that the selection process is based on other factors. As a general rule, happy individuals seek to listen to music they find subjectively happy sounding to regulate their emotions.

## **2.2 Emotional Primes Influencing Streaming Intentions**

The term "streaming intentions" has been derived from purchase intention for this study. Intentions are defined as, "the person's motivation in the sense of his or her conscious plan to exert effort to carry out a behavior" (Eagly & Chaiken, 1993, as cited in Spears & Singh, 2004, p. 56). This definition is thus applied to digital music streaming intentions as the act of listening to a majority of a song, or rather, not skipping a song after

approximately 10 seconds. Since emotions drive consumer decision-making and intentions (Achar et al., 2016), emotional effect will play an important role in digital streaming algorithms.

Six BHEs are often analyzed in marketing research: *surprise, fear, disgust, anger, happiness, and sadness* (Spivak et al., 2021). As variables, these emotions are each quite complex and capable of serving as either dependent or independent variables, and are often influenced by basic demographics. For example, positive emotions often correlate with receiving candy as a child in recognition of an accomplishment, while eating candy as an adult is correlated with negative emotions due to health concerns (Mizerski & Dennis, 1986). By gaining an understanding of past emotional experiences with the product, Mizerski and Dennis (1986) determined that marketing schematics aim to relieve negative emotions or focus on positive emotions to build a stronger connection with the consumer.

This study will focus on four of these basic human emotions: *happiness, sadness, anger, and fear*. These specific emotions are being looked at because they have been identified as emotionally recognizable in music (Eerola & Vuoskoski, 2013; Fritz et al., 2009). Furthermore, research has shown that consumer decision-making is strongly driven by these same four emotions (Achar et al., 2016). Although the research conducted by Achar et al. (2016) relates to the general consumption of goods and services, it has been demonstrated that the basic *characteristics* influencing consumer decision-making are also associated with digital music streaming intentions (Maasø & Hagen, 2020). The prominence of the music streaming industry today has prompted the creation of algorithms to better predict what listeners may want (Maasø & Hagen, 2020).

Research has also found an association between music selection intention and the perceived emotional effect of a song (Mohn et al., 2010). The

emotional effect is the emotion generated because something evokes that emotion (Stout & Leckenby, 1986). The perceived emotional effect of listening to a song is the emotion an individual thinks that song will evoke when they listen before, during, and after listening to the song. Music selection intentions are for emotional regulation (Juslin & Laukka, 2004). Furthermore, listening to music indeed appears to affect emotional influence and alteration (Dolgin & Adelson, 1990). This would imply that individuals base their streaming intentions on their perception of the emotional effect of a song. Juslin and Laukka (2004) note that listeners primarily value the emotional impact a song has on them. Thus, it is reasonable to hypothesize that an association exists between pre-listening BHEs of listeners and music streaming intentions to attempt to regulate their emotions.

When digital music consumers decide to stream a particular song, they may perceive that the chosen song or songs will confer upon them a happy effect (Kratz, 1993). This may be done through a song setlist that emotionally primes the listener with a descriptor such as “happy music.” There have been perceived positive outcomes directly connected to listening to music with a happy effect (Huang et al., 2021). The primary finding was that music perceived as having a happy effect may positively impact an individual experiencing a different pre-listening emotion, such as fear or anxiety (Huang et al., 2021). This suggests that an individual seeking to stream happy music may do so for emotional alteration. This supports the argument made by Mohn et al. (2010) that emotional perception influences music selection by music streaming consumers.

Research has found that individuals do not listen to music only for emotional happiness. The research done by Tamir (2009) shows that music listeners are not streaming music intending to regulate or influence only happiness. A listener may intend to regulate other emotions, such as sadness, instead of countering their negative emotion by listening to a song they perceive as

having a positive effect. Listening to music may also be done to regulate or maintain other emotions or outcomes (Moore, 2013). One explanation for this behavior is that someone listening to music may want to regulate a particular emotion to inspire creativity (Ritter et al., 2017). Against popular belief, psychological research has found that people do not always desire to feel positive emotions (Tamir, 2009).

A critical research project found that listening intentions are centered around the emotional regulation of the present state of emotions (Thoma et al., 2012). This would imply that pre-listening BHEs reflect the perceived emotional effect of the song a music listener intends to choose. Although the research done by Thoma et al. (2012) contradicts the findings of Huang et al. (2021), there is an explanation for this. Huang et al. (2021) were doing research primarily in the music therapy field, whereas Thoma et al. (2012) were focusing on the decisions being made daily by music listeners as consumers to determine if an individual's pre-listening BHEs are in congruence with the perceived emotional effect of the selected song.

### **2.2.1 Emotional Priming through Colors**

Colors are another way that marketing managers and content creators can emotionally prime their content. This can be applied to the creation of playlists or album covers as well. Research has identified emotional sentiment and responses revolving around certain colors (Kaya & Epps, 2004). In Kaya and Epps' (2004) research, they determined which colors were most closely associated with certain emotions. For sadness, it was determined that gray, black, and purple evoked sad emotions, while anger was most likely to be triggered by the color red (Kaya & Epps, 2004). Fear was primarily evoked by the color black, while happiness was most closely associated with yellow or yellow-red colors, and calmness was found in darker colors such as purple and blue (Kaya & Epps, 2004).

Broadly speaking, brighter colors are associated with positive emotions while darker colors are associated with negative emotions (Hemphill, 1996). In the study done by Hemphill (1996) with undergraduate students, red was most associated with positive emotions and excitement. Furthermore, with its association to calmness, blue was found to elicit the highest levels of positivity in Hemphill's (1996) study followed by green and yellow. Gray was primarily associated with negative emotions because it reminded the individuals of rainy days, followed by black and brown (Hemphill, 1996).

The study done by Hemphill (1996) contradicts Kay and Epps' (2004) findings on the color red. On one side, Hemphill (1996) determined that red was more associated with excitement, while Kay and Epps (2004) suggest the more traditional association between red and the emotion anger. Hemphill's (1996, p. 280) reasoning for this traditional contradiction was that participants viewed red more positively, describing it as a "strong positive color" and "warm color".

The research conducted by Thoma et al. (2012) suggest that individuals listening to music will make selections with the intention of emotional regulation of their pre-listening BHEs. The color associated with the selection, whether that be playlist or album cover, may influence this decision-making process based on the intentions of the individual. For example, if an individual intends to listen to sad music for emotional regulation while they are sad and are presented with two sad playlists with different colors, they may tend to lean towards a playlist with darker colors rather than bright colors. This would be in accordance with the research done both by Kay and Epps (2004) and Hemphill (1996).



### 2.3 Emotionally-Induced Streaming Intentions Based on Song Characteristics

For this study, the definition of *streaming selection* will be adapted from the definition of decision-making, with a focus on deciding which music to stream. Decision-making refers to selecting the best of multiple options (Beach, 1993). Argstatter (2015), Fritz et al. (2009), and Eerola and Vuoskoski (2013) all determined that some emotions are universally perceivable through music listening, which would imply that music listeners are perceiving emotions through basic song *characteristics*. Furthermore, the musical structure has been found to have a significant impact on emotional reactions in listeners (Scherer & Coutinho, 2013). If there are universally perceivable emotions in music, then an individual's pre-listening BHEs will influence the *characteristics* of song selection (Juslin & Västfjäll, 2008).

Within music, basic song *characteristics* represent emotional cues (Balkwill et al., 2004). Music streaming has been found to serve the purpose of emotional regulation (Juslin & Laukka, 2004), which suggests emotional cues of basic music *characteristics* influence streaming selection based on the listener's pre-listening emotions. Therefore, basic song *characteristics*, *tempo*, *mode*, and *rhythm* are scrutinized in this study, both of which have cues that influence emotions (Balkwill et al., 2004).

Emotions can also influence basic song *characteristics* in the composition process (Behrens & Green, 1993). Since emotional input and output have been found in basic song *characteristics*, emotions can be strongly tied to music creation as well as listening. One of the central purposes of music composition is emotional communication between the composer and listener (Gabrielsson & Juslin, 1996). Furthermore, Behrens and Green (1993) found that the emotions being conveyed by the composer can be identified by individuals with minimal understanding of music composition. This study is

focused on music listening, but the importance of emotional influence in the creation process is not to be underestimated as it shows the emotional basis from where basic song *characteristics* are derived (Behrens & Green, 1993).

The findings of Balkwill et al. (2004) suggest that music perceived as having a happy effect generally has the following basic *characteristics*: “fast in tempo, major in mode, wide in pitch, high in loudness, regular in rhythm, and low in complexity” (p. 337). Balkwill et al. (2004) go on to show how this is not commonly disputed when looking at it from a basic human emotion perspective. The following sections will take a closer look at three basic song *characteristics* and their basic emotional cues.

### **2.3.1 Emotional Cues of Musical Tempo**

Tempo in music “communicates the pace of a piece of music (i.e., how fast or slow it is) and is typically associated with the rate of periodic events (beats) that listeners perceived to occur at regular (equal) temporal intervals” (McAuley, 2010, p. 166). The musical tempo of a song can be viewed from two different perspectives: perceived tempo and actual tempo (Lapidaki, 2000). When studying digital music listeners who are casually listening to music, perception of tempo is the variable of interest. When perceiving tempo, there are three main standards researchers use: fast, medium, and slow tempi (Balkwill et al., 2004; Hockman & Fujinaga, 2010; Liu et al., 2018). Hockman and Fujinaga (2010) focus on fast and slow classifications to retain simplicity; however, Liu et al. (2018) identified medium-tempo music to also have an association with emotions.

Perceiving tempo and experiencing an emotional response from song tempo are not always associated. Studies have found that individuals prefer tempi with a beat per minute that matches their heart rate (Iwanaga, 1995), while on the other side, musical tempo have been identified to have a positive

relationship with heart rate (i.e., as tempo increases, so does the heart rate) (Thakare et al., 2017). Furthermore, temporal qualities of music drive dancing and movement (Levitin et al., 2018), potentially because of the influence tempo has on heart rate (Thakare et al., 2017). This suggests that an emotional response may occur regardless of whether the listener consciously perceives the tempo (Liu et al., 2018). Hock and Fujinaga (2010) identified that individuals can perceive tempo on a fast and slow model; however, medium tempo was found to evoke an emotional response regardless of perception (Liu et al., 2018). Medium tempo may be perceived as fast or slow by non-musician listeners and does not receive as much attention from researchers; however, Liu et al. (2018) studied the emotional response of pre-determined song tempo, studying emotional responses through functional magnetic resonance imaging (fMRI) and electroencephalography, which allowed them to look at the effects of tempo on brain function.

Tempo in the simple classification of fast and slow has been reported in academic literature to relate to the BHEs of happiness and sadness. Gagnon and Peretz (2003) demonstrated an association between fast tempi and the perception of happy emotions. Furthermore, Gagnon and Peretz (2003) reported an association between slow tempi and the perception of sad emotions. This aligns with the findings of Balkwill et al. (2004), apart from medium tempo yielding a strong emotional response with the absence of valence (Liu et al., 2018). In addition, the tempo of a song has a connection to anger and fear. Prior studies have found that slow tempi are more relaxing, and thus preferred by individuals experiencing fear or anxiety (Elliott et al., 2011). While fast tempi are preferred by individuals experiencing anger, as it helps match their emotion (Sharman & Dingle, 2015). However, research does not indicate that individuals perceive anger and fear based on tempo alone, but rather reveals their preferred tempo when experiencing those emotions.

For this study, only fast and slow tempi are being taken into consideration since this study focuses on emotional perception, rather than analyzing physiological, emotional responses that can only be measured through functional magnetic resonance imaging (fMRI).

### **2.3.2 Emotional Cues of Musical Modality**

A mode is commonly defined as “a set of musical tones and tone relationships that are used to create a melody” (Bowling, 2013, p. 1). In Western musical art traditions, modality tends to be classified as either major or minor (Virtala et al., 2012), which are defined as “the twin poles of expression” (Cooke, 1959, p. 50). More complex and specific classifications of musical modality do exist (Bowling, 2013), which include: Ionian, Phrygian, Dorian, Mixolydian, Aeolian, Locrian, and Lydian (Godley, 1952). However, research generally focuses on the emotional perceptions of the basic classifications of major and minor modes (Gerardi & Gerken, 1995; Lin et al., 2014).

Tempo has a stronger correlation to emotional perception than modality (Bella et al., 2001); however, musical modality still yields consistent emotional cues in music (Gerardi & Gerken, 1995; Lin et al., 2014). Concluding associations between emotions and modality requires an adequate understanding of musical listening and emotional cognition (Gerardi & Gerken, 1995). Prior research has found that in Western music, a major mode creates a positive emotional perception, and a minor mode generates a negative emotional perception (Bowling, 2013; Cooke, 1959; Fang et al., 2017; Kastner & Crowder, 1990; Lin et al., 2014). Hoshino (1996) also describes major and minor modes as “bright-dark” and “joyful-sad”. Furthermore, Lin et al. (2014) found major modes to generate a positive emotional effect in congruence with fast tempi, whereas minor modes can generate negative emotional effects in correlation with slow tempi; however,

the musical modality has not been found to impact the listening intentions of individuals experiencing fear or anger, even when connected to certain tempi (Elliott et al., 2011). This would imply that musical modality is most perceived through happy and sad emotions, yet not as much through angry or fearful emotions.

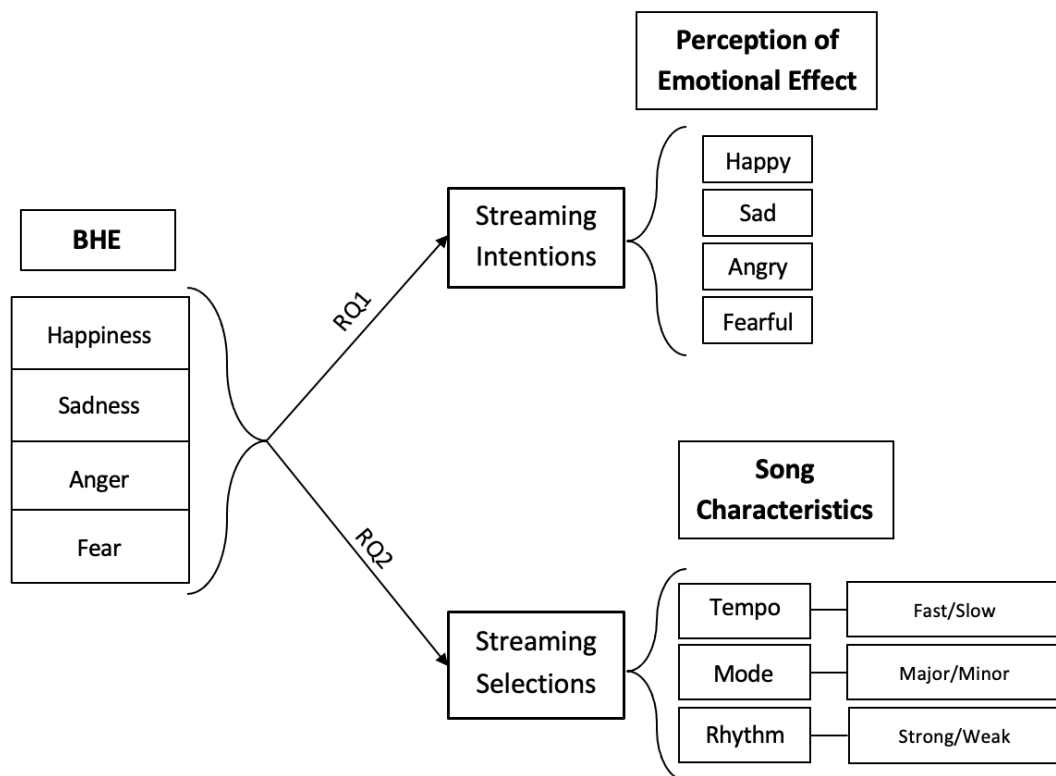
### **2.3.3 Emotional Cues of Musical Rhythm**

Rhythm is referred to as the most universally recognized characteristic in music (Elliott et al., 2011), and is defined as “the serial pattern of variable note durations in a melody” (Schulkind, 1999, p. 896). There are two main aspects of rhythm generally focused on, as pointed out by Schulkind (1999): beat and meter. In Western music, beats “occur at regular intervals, thereby creating a steady pulse”, while the meter defines the beat accent as either strong or weak beats (Schulkind, 1999). Additionally, Western music commonly portrays a recurring strong beat with set intervals, generating beat predictability for the listener (Schulkind, 1999).

Music listeners automatically organize rhythmic sequences while listening to music, which generates an emotional connection between the listener and the rhythm of a song (Scherer & Coutinho, 2013). An emotional connection is established through a strong rhythm’s impact on the peripheral nervous system, creating a contagious and motivational effect that generates movement in the listener (Levitin et al., 2018; Scherer & Coutinho, 2013). These movements were identified by Scherer & Coutinho (2013) as either head nods or leg tapping and can also be expressed in dance. Such movements are seen as intensifiers of the subjective emotions of the listener, with the stronger the beat, the more intense the subjective emotion of the song is, which may be set primarily by tempo and mode (Scherer & Coutinho, 2013). Additionally, positive emotions are generally connected to stronger and more predictable rhythms that are more danceable (Saarikallio, 2011).

## 2.4 Research Model

*The conceptualization model for the effect of pre-listening basic human emotions on music streaming intentions and selections:*



## 3 Methodology

The objective of this study was to determine how subjective pre-listening Basic Human Emotions (BHEs) are associated with the song-streaming decision-making process. The pre-listening BHEs in this study included happiness, sadness, anger, and fear. The dependent variables included song-streaming intentions and song-streaming selections. Song streaming intentions were based on the perceived emotional themes of songs derived from emotional primers: happy, sad, angry, or fearful. Streaming selections were based on fundamental musical elements, including tempo (fast or slow), mode (major or minor), and rhythm (strong or weak).

### **3.1 Study Design**

This research was conducted as a qualitative research project, using descriptive and exploratory methods. Qualitative research seeks to elaborate on the quality of relationships (Islam & Aldaihani, 2021). This subject matter is in a preliminary state of understanding and is best approached with qualitative methods, as there are many variables and relationships to consider for future quantitative research. Quantitative research involves statistical analyses of data to test for an association between the independent and dependent variables within a hypothesis (Singh, 2006) and will require pre-test knowledge of these variables from qualitative research, in order to anticipate confounding and interactions that will need to be controlled or avoided altogether in study designs. While quantitative research is based on standardized statistical analyses with less potential for bias (Basias & Pollalis, 2018), a qualitative research approach will allow for a more flexible data analysis to better identify future research variables for quantitative analysis. Islam and Aldaihani (2021) note that qualitative research is best used when theories need strengthening. For example, academic literature reveals the emotional connections between consumers and song selection, but less about how consumers are driven by their own emotions to select and fully listen to a song. Understanding why a listener skips a song may lead to a better understanding of why the listener decides to stay on a song. This qualitative research aims to establish a basic understanding of the association between basic human emotions and song selections.

Data collection involved interviews with individuals that fit the study's demographic and filtered focus. This method was the most effective for the collection of new data on listener behavior with consideration to personal subjective emotions. Participants were asked to recall emotions and answer decision-making questions in a music-listening setting. The purpose of this

method was to better determine why a listener is choosing to listen to certain music when they are experiencing certain basic emotions; in congruence with what types of songs they would choose classified by musical *characteristics*.

### **3.2 Survey Development & Measures**

The interview questions were designed to better explain the emotionally-induced music selection process. The primary objective was to gain a better understanding of the emotional intentions behind musical selection congruence with the what the listener chooses. The data collection first determined the emotional intentions users have in selecting a playlist with an emotional prime or description; whether they intend to regulate or alternate their emotion with the selected playlist. Then, the interview collected information on what musical *characteristics* (tempo, mode, and rhythm) individuals prefer when experiencing certain emotions in congruence with their emotional intention of regulation or alteration. Finally, information was collected on actual songs individuals would select under the certain emotional circumstances to compare the musical *characteristics* and verify which *characteristics* are most sought after within certain emotions.

The survey began with a cover letter welcoming the participants to the study and informing them of the project objectives. The cover letter also informed participants that they will have access to the results of the project, to reinforce the social exchange theory that participant response rates are improved when participants receive something of interest in return for their contribution. Additionally, the cover letter included a data privacy clause, emphasizing the importance and intent of maintaining the confidentiality of the participant's private information.



The survey was comprised of approximately 16 close-ended and 16 open-ended questions, excluding filtering questions. The questions repeated for each emotional recollection category, which sped up the interview process for participants. At the beginning of the survey, participants were given four filter questions. The participants were asked to identify which generational cohort they belong to, a “yes” or “no” question to determine if they are university students, a “yes” or “no” question if they digitally stream music, and finally if they stream at least one of the top six genres of music, which include: pop, rock, the 90s, the 80s, soundtracks, and/or hip-hop/rap/trap (Susic, 2023). When the participant met the selection criteria for the study, they were asked questions about digital music streaming decisions based on basic human emotions they experience.

The organizational format of the survey was arranged in four sections, each section representing a basic human emotion recollection. This was to measure the association between basic human emotions and streaming decisions. To measure basic human emotions, the survey attempted to conjure the four basic human emotions being used in this study (happiness, sadness, anger, and fear) through emotional recollection and auditory stimulation. Emotional recollection was conducted by prompting participants to recall a time when they felt happy, sad, angry, or fearful while listening to an emotional stimulus. The survey started by asking participants to “think of a situation in which you experienced” the emotion in question (Wallbott & Scherer, 1989, p. 66). While thinking of a time when they experienced this certain emotion, they were asked if they would listen to a song that shares *characteristics* commonly associated with those emotions. Upon consent for each emotion, the participant would listen to the emotional stimuli while recalling the emotion. The objective was not for the participant to analyze the stimuli songs, but rather to help them recall an emotion better. The following songs were used as emotional stimuli throughout the interview process:

**Table 1: Auditory Emotional Stimuli**

Emotion	Song Title	Source
Sadness	Adagio for Strings, Op. 11	Barber (1936)
Anger	The Four Seasons – Summer in G Minor, RV. 315: III. Presto	Vivaldi (ca. 1720)
Fear/Anxiety	The Four Seasons – Winter in F Minor, RV. 297: I. Allegro non molto	Vivaldi (ca. 1720)
Happiness	Carmen Suite No. 1: 5. Les Toréadors	Bizet (ca. 1885)

Once the survey prompted the participant to recall an emotional experience, they were instructed to answer subsequent questions to determine streaming decision-making. Emotionally-induced streaming behavior was determined by identifying possible decisions the user made when experiencing a certain emotion. The participant was given three different decisions to make under each emotional recollection: playlist selection, song selection, and song skip.

For the playlist selection, the participant was presented different playlists, each with emotionally priming descriptors that relate to a basic human emotion. The participant then selected which playlist they are most likely to select when experiencing a certain basic emotion, which they will then be asked to provide an explanation for their decision. The playlist specifics are shown in Table 2.

**Table 2: Playlists**

Playlist #	Title / Description	Color	Photo	Source
Playlist 1	Lonely Sad Mix	Blue/Green	Spotify Mix	Spotify (2023)
Playlist 2	Rage Mix	Dark Purple	Spotify Mix	Spotify (2023)

Playlist 3	Anxiety Relief	Orange	Person Backpacking	Extra Music (2022)
Playlist 4	Happy Songs Everyone Knows	Yellow/Blue	Smiling person	Skye (2023)
Playlist 5	Angry Mix	Dark Blue	Spotify Mix	Spotify (2023)
Playlist 6	Feel Good Happy Mix	Green/Grey	Spotify Mix	Spotify (2023)
Playlist 7	Anti Anxiety Mix	Green	Spotify Mix	Spotify (2023)
Playlist 8	Sad music for crying hours and depressing times	Brown	Homer Simpson Crying	JudasVargas (2020)

Following were questions related to the listening decision-making process. The participant was provided with the first 10 seconds of eight different audio tracks. From here, the participant was instructed to signify which track they are most likely to fully listen to and skip. The eight different tracks are unique in their tempo, mode, and rhythm, divided as so:

**Table 3: Musical Characteristics of Clips**

Clip #	Tempo	Mode	Rhythm
Clip 1	Fast	Major	Strong
Clip 2	Fast	Major	Weak
Clip 3	Fast	Minor	Strong
Clip 4	Fast	Minor	Weak
Clip 5	Slow	Major	Strong
Clip 6	Slow	Major	Weak
Clip 7	Slow	Minor	Strong
Clip 8	Slow	Minor	Weak

The clips that are used are all short piano clips ranging from 10-20 seconds long. They were chosen as piano clips to help eliminate genre bias as much as

possible and focus more on musical *characteristics*. Additionally, similar artists were chosen to keep the musical styles similar. The participants were not provided the titles of the clips to avoid swaying the answers and to see what decisions were made based on listening alone. The following clips were chosen for the clip selection portion of the survey:

*Table 4: Piano Clip Titles*

Clip #	Tempo	Mode	Rhythm	Clip Title	Source
Clip 1	Fast	Major	Strong	Time by Tony Ann	Ann (2023)
Clip 2	Fast	Major	Weak	I Miss That Time by Austin Farwell	Farwell (2020)
Clip 3	Fast	Minor	Strong	Blessings by Austin Farwell	Farwell (2021)
Clip 4	Fast	Minor	Weak	Anxiety by Tony Ann	Ann (2023)
Clip 5	Slow	Major	Strong	New Home (Slowed) by Austin Farwell	Farwell (2021)
Clip 6	Slow	Major	Weak	Grief by Tony Ann	Ann (2023)
Clip 7	Slow	Minor	Strong	Smile More (Slowed) by Austin Farwell	Farwell (2022)
Clip 8	Slow	Minor	Weak	Včera by Zemfira Mironova	Mironova (2021)

Participants were asked to listen to each clip and think about which clip they would be most likely to fully listen to and skip. Once the participant decided which song they were most likely to select and skip, they were then prompted to give a brief explanation of their choice. This was followed by a short-answer question asking the participant to provide a song they would select to listen to when they are experiencing a certain emotion. This song could be any song of their choice and was used to compare the musical

*characteristics* of the short clip they chose and their song of choice for that specific emotion.

### **3.3 Limitations**

One of the greatest limitations of this study is controlling for individuals' life experiences since these influence people's current understanding, interpretation, and feeling of certain emotions. It is not possible to entirely control each participant's experience, but one way this limitation was minimized was by interviewing participants with similar life *characteristics*. This was done by focusing on Western Society and the life experience of university students. This study did not focus any further than this, which is an intentional limitation of the study.

The risk of familiarity with the piano clip selection portion of the interview arose as a limitation. The purpose was to analyze the selection process of an individual when they were experiencing certain emotions. Each clip selected was not a commonly known song to minimize the potential for familiarity bias. Unfortunately, after the clips had been selected and the interviews had begun, Clip 5 went viral on TikTok and became commonly associated with comedic memes. It was popular for the ironic slow and sad sound paired with a funny video. Since this clip became widely known in a short period, this limitation was mitigated in two ways. The first was to see if the participant started laughing when they heard Clip 5. If so, participants were asked if they could try and ignore their familiarity when selecting the track as best as possible to help mitigate this issue. The second was to reinforce the clip selection results with the song selection results and conduct a comparative analysis to strengthen the results based on musical *characteristics*.

## 4 Results & Analysis

Twenty-one participants were interviewed for the data collection process. Each interview was around 45 minutes. All responses were transcribed and analyzed for selections and explanations.

Each participant's answers were analyzed for the association between the recalled emotions and inferred emotions of the playlists and song clips played, with the goal being to determine if the current academic understanding of emotionally-induced song selection aligns this study's findings. It was found that there is no consistent intention for listening to music, and the reasons given can be placed in three categories: emotional regulation, emotional alteration, and emotional avoidance. The analysis will focus primarily on the most common intention per emotion. The explanations of the decisions will give further insight into music listeners' decision-making under certain emotional conditions. Furthermore, the songs that the participants provided were analyzed for emotional ties in basic music *characteristics*. This will help strengthen the results of the closed-ended questions.

### 4.1 Sadness

The first emotion focused on during the interview process was sadness. Participants were prompted to think of a time when they were experiencing sadness while listening to the emotional stimulus song Adagio for Strings, Op. 11. After listening to approximately two minutes of the song, they were asked to select which of the eight playlists they would be most likely to select. Then, while maintaining the recollection of the emotion of sadness, participants listened to the eight piano clips and stated which they would be most and least likely to select. Finally, they provided a song they would listen to when experiencing the emotion of sadness.

#### 4.1.1 “Sadness” Playlist Selection

The dominating playlist selected for sadness was Playlist 1 (Lonely Sad Mix), which was selected six times. The selections were more widespread with this emotion, as the second most selected playlist was Playlist 2 (Rage Mix), which was selected five times. Finally, the third most selected playlist was Playlist 8 (sad music for crying hours and depressing times), which was selected four times. In this case, all three of the top selected playlists are listed because they represent the participants' range of selections when choosing a playlist while experiencing sadness.

Thirteen of the 21 participants selected their playlists with the intention of emotional regulation, while seven made decisions with emotional alteration intentions. Both Playlist 1 and Playlist 8 are labeled with sad emotional primes, showing that most of the participants would aim for regulating their emotions by choosing a playlist that matched their emotions. Playlist 2 is primed with an anger emotion, and this was selected primarily by individuals intending on alternating their emotion into an anger state. Participants stated that this was because they associated their sadness with anger, or they felt they were able to manage their anger better than sadness.

Playlist 1 was colored with a mixture of light blue and green. Although, color was seldom mentioned by participants in the playlist selection process, this would imply a connection between the coloring of the playlist. The other emotionally-primed playlist was Playlist 8, which had a brown coloring; however, the stronger preference was for the playlist with blue and green. This could also be explained by Playlist 8's image of Bart Simpson, being mentioned by some participants as “comedic” and not sad. Finally, Playlist 2 has a dark blue color, suggesting that sad individuals may prefer blue or darker colors when experiencing sadness.

The most frequent reason mentioned for making the selection was based on the title description. Participants also mentioned they made their decision based on perceived relatability and ability to process their emotions. These sad playlists were expected to help the listener immerse themselves in the emotion, feel more sadness, and let it out. Overall, the primary intention behind the playlist selection when experiencing sadness was emotional regulation.

#### **4.1.2 “Sadness” Piano Clip Selection**

The most selected clip by participants when recalling feeling sad was Clip 7 (Smile More (Slowed) by Austin Farwell), selected six times, followed by Clip 6 (Grief by Tony Ann), selected four times. Clip 7 was a slow, minor clip with a strong rhythm, while Clip 6 is a slow, major clip with a strong rhythm. The common characteristic between these two clips is the tempo, which is slow. Participants were more likely to choose clips with a slower tempo, whereas the other *characteristics* were not as noticed.

Fifteen participants stated they chose the clips with the intention of emotional regulation. Although most of these participants selected slow clips, some emotional regulation intentions reflected faster clips since they associate their sadness with other emotions such as anger.

The participants most frequently described the reason for their selection because the clip sounded “sad.” Another common reason for clip selection was because of “memories” triggered in the participant. They found sad memories attached to the sounds, and this brought them comfort in their selection because they felt like they could relate more. Tempo and slowness were mentioned, showing the perception of musical *characteristics* by the participants. Additionally, “processing emotions” and “hope” was mentioned.



Overall, most of the participants sought out slow clips that made them feel sad.

#### **4.1.3 “Sadness” Piano Clip Skipping**

The clip found to be most frequently skipped was Clip 1 (Time by Tony Ann), with seven skips, and Clip 2 (I Miss That Time by Austin Farwell), with four skips. Clip 1 was a fast, major clip with a strong rhythm, while Clip 2 was a fast, major clip with a weak rhythm. Fast and Major can be seen as common musical *characteristics* between these two clips. This shows that participants intend to skip songs that appear fast to them with a major mode when they are feeling sad.

The primary reason found for skipping song clips was because of emotional alteration in the direction of annoyance or anxiousness. The primary explanation participants gave for their song skip was based on the tempo. Furthermore, individuals stated that they skipped these clips because it made them feel “overwhelmed” and “anxious.” Overall, song skipping while recalling sadness was based on fast, major songs that altered emotions in a way participants did not want.

#### **4.1.4 “Sadness” Song Choice**

After each song selection was analyzed, the most common types of songs found were slow, major songs with a strong rhythm, selected seven times. This is followed by slow major or minor songs with a weak rhythm, both selected four times. The most common characteristic found in all these types is the tempo, being slow. Participants consistently selected slow songs. The major mode was the most frequently selected as well, which contradicts the literature. Rhythm type seems to be inconsistent in song selection, so it is

perhaps not a significant determining characteristic when individuals are making music selections while sad.

Fifteen participants chose songs intending to regulate their sadness. The most frequent explanation provided was centered around lyrics. The lyrics generally made the songs sad, triggered memories, and generated relatability with the listeners.

The consistency of musical *characteristics* between music clip selection and song selection was also analyzed to determine which characteristic remained the most consistent. This was found to be tempo, which was consistent in 15 participants. The mode was consistent in five participants, while the rhythm style was consistent in eight participants. This shows that tempo is the most prominent musical characteristic in music selection when individuals are feeling sad.

## 4.2 Anger

This emotion was the most difficult for participants to recall. Many respondents said that they do not feel this emotion frequently enough to recall it but that they understand how they deal with it. Furthermore, many individuals said that they can manage this negative emotion most effectively in comparison to other negative emotions. This could be explained by the frequency of which individuals experience anger, on both small and large scales (Bhave & Saini, 2009). Individuals experience small angering annoyances on a daily basis and learn how to process them (Bhave & Saini, 2009). Thus, the greater the experience with an emotion perhaps the easier it becomes to regulate and process.

#### **4.2.1 “Anger” Playlist Selection**

Fifteen participants said they would select Playlist 2 (Rage Mix) when they are feeling angry, while five said they would select Playlist 5 (Angry Mix). The primary reason Playlist 2 was selected instead of Playlist 5 was that the term “rage” was interpreted as more intense than “angry.” Individuals wanted to listen to music they perceived as being more intense so that it would match their emotions better.

Participants preferred the playlist with a dark purple color rather than the playlist with a dark blue color. Although, this could be explained by the difference in titles and perception of “rage” versus “anger,” dark purple paired with “rage” could signify a stronger sense of the emotion. The dark color of the playlists was also mentioned in the explanation for selection, as this resonated with two of the participants.

Eighteen interviewees selected playlists for emotional regulation. It was said that by listening to music that matched their angry emotion, they would be able to deal with the emotion more effectively. The title of the playlist was the most mentioned because it generated the perception that the songs would be intense songs that were relatable and helpful in processing anger. Some individuals mentioned that listening to rageful music while angry would help them turn their anger into productivity.

#### **4.2.2 “Anger” Piano Clip Selection**

The most selected clip when participants were recalling anger was Clip 4 (Anxiety by Tony Ann), which was a fast, minor clip with a weak rhythm. This clip was selected 15 times, while other clip selections were dispersed. This shows a strong tie to these musical *characteristics* and this emotion.

Participants stated that the primary purpose for clip selection was emotional regulation. They expressed a preference for facing emotions head-on by listening to songs that matched their energy and emotion, like the process of playlist selection. Fast tempo emerged as one of the main factors influencing their choices. The selected clip was described as intense and angry, yet also relatable. Consequently, individuals tended to opt for the clip with a fast tempo, minor key, and weak rhythm to regulate their feelings of anger.

#### **4.2.3 “Anger” Piano Clip Skipping**

The top two clips most likely to be skipped when participants were feeling angry were Clip 1 (Time by Tony Ann) and Clip 7 (Smile More (Slowed) by Austin Farwell). Clip 1 is a fast, major clip with a strong rhythm, while Clip 7 is a slow, minor slip with a strong rhythm. Each clip was selected five times. The common characteristic amongst this is the rhythm, showing that most individuals would skip songs with strong rhythms.

The most frequently mentioned reason for skipping these tracks, however, was the tempo. Eight clips were skipped because they were too slow. It was mentioned that the slowness was too “calm” and “light” and would not allow for emotional processing and confrontation. Those who seek emotional alteration when angry would skip clips because they said that the track, they skipped would increase the angry emotion. For emotional regulators, the slow clips were annoying.

#### **4.2.4 “Anger” Song Selection**

The two most frequent song types found in angry music listeners were fast, major, and weak rhythm songs and fast, major, and strong rhythm songs. Each was selected seven times. This shows a strong association with the perception of fast, major songs in listeners feeling angry. Fast, minor songs

with a weak rhythm were only selected twice, which has the same *characteristics* as Clip 4, the most selected. Furthermore, strong and weak rhythms were both equally selected.

The songs were primarily selected for their lyrical content. Participants expressed a desire to listen to songs that involve “screaming,” and sound “angry” with a fast pace, a large amount of energy, and a “release” of emotions. Additionally, 16 participants selected these songs for emotional regulation. They would like to face the emotion and identify songs that represent their current emotional state best.

The consistencies between the song selection and clip selection show that tempo and rhythm were both equally consistent. Fifteen participants selected fast songs, while 11 participants selected songs with weak rhythm, and three with strong rhythm. The mode was much less consistent in song selection and clip selection. Since the most consistent *characteristics* were a fast tempo and weak rhythm, most participants want to listen to songs that have a fast tempo with a weak rhythm. Furthermore, they primarily seek emotional regulation through songs that match their energy and have angry and aggressive lyrics.

### **4.3 Fear**

Fear was most associated with the feeling of anxiety. This was an emotion commonly experienced and easily recallable by most of the participants. As this negative emotion was easily recallable, this section was handled carefully because the objective was not to get the participants to experience anxiety during the interview process but rather for them to recall a time when they felt this emotion. When the emotional stimulus song was played for participants, there were some occasions when the song was ended early to

not over-evoke the emotion. Additionally, this negative emotion was noted multiple times as the participant's most disliked emotion.

#### **4.3.1 “Fear” Playlist Selection**

The most frequent playlist selected was Playlist 3 (Anxiety Relief), selected seven times. Participants perceived this playlist as altering their emotions into a state of calmness. Playlist 2 (Rage Mix) and Playlist 6 (Feel Good Happy Mix) were selected four times each, also to alter the emotion. Some found it easiest to alter the emotion into anger so that they could deal with it better, and others found altering their mood into a happy state could help them calm down better. The intentions are rather dispersed, but one consistency is that individuals do not seek to make themselves feel more anxious or regulate fear very often.

Playlist 3 was a calming orange color, as mentioned by participants. They selected this playlist more than the other “anxiety” playlist because the bright green color of Playlist 7 (Anti Anxiety Mix) was too intense. The colors paired with the picture of Playlist 3 provided a calming feeling to participants, and thus preferred this playlist. If Playlist 7 had a dimmer and more calming green color, it might have been selected more frequently.

Most participants sought to alter their fearful emotional state towards a more positive emotion. Title and description were found to be the most common reason for playlist selection, as they allowed individuals to perceive the contents of the playlist based on how they wanted to handle their fear and anxiety. These intentions range from a perception of calmness, anger, or happiness. As this emotion is attached to a lot of complex experiences, it is difficult to remain consistent in how individuals choose to deal with this emotion; however, the most common theme was that individuals sought to calm themselves.

#### **4.3.2 “Fear” Piano Clip Selection**

Clip 5 (New Home (Slowed) by Austin Farwell) was selected eight times, followed by Clip 3 (Blessings by Austin Farwell) and Clip 1 (Time by Tony Ann) selected four times each. The most common characteristic between these clips is a strong rhythm. Since rhythm strength is characterized by listener predictability, this could be interpreted as listeners enjoying listening to songs they can predict while feeling anxious. Strong predictable rhythms bring comfort to listeners since they can predict what is to come.

Clip selection intentions were consistent to alter this emotion. The reason for the selection was most frequent because they perceived the song selection as calming. The song selection brought a feeling of happiness, which was generally described as “good,” “warm,” and “relaxing.” The tempo was also mentioned, but usually for faster clips. Overall, individuals seem to want to select clips with a strong rhythm that brings them good feelings when feeling fearful or anxious.

#### **4.3.3 “Fear” Piano Clip Skipping**

The clips most likely to be skipped were Clip 4 (Anxiety by Tony Ann) and Clip 1 (Time by Tony Ann), each selected six times for skipping. Clip 4 has a very “creepy” sound to it, and is a fast, minor clip with a weak rhythm. It is a very unpredictable clip, aligning with the idea that individuals want to control and predict the flow of music in the songs they listen to. However, Clip 1 has a very strong and predictable rhythm, and was also one of the most selected clips for this emotion as well. The reason for this is that Clip 1 was more consistently skipped by the individuals that did not select the most frequently selected clips for this emotion. This is most likely related to the tempo of the track rather than the rhythm.

Emotional intentions for skipping clips in this emotion were mostly because the clips skipped would have increased their anxiety. The skipped clips were very commonly described as evoking anxiety. Tempo was mentioned for both fast and slow, so it depends on what brings anxiety to the listener, as both were found to cause fear in certain individuals. Additionally, participants stated that the skipped tracks made them feel “overwhelmed,” or “annoyed” and not helping with the emotion. Scientific research has found that weak or uneven rhythms are generally more difficult for individuals to process, especially when paired with a fast tempo (Lamb, 2012). When a music listener is experiencing anxiety or fear, they do not seek to listen to music that is difficult to process because this will ultimately increase their anxiety. Overall, individuals would skip songs that increased their anxiety that have unpredictable rhythms or overwhelming tempi.

#### **4.3.4 “Fear” Song Selection**

Three song types were consistently selected by individuals experiencing fear at an equal quantity: slow, major songs with a strong rhythm, fast, major songs with a strong rhythm, and slow, major songs with a weak rhythm. The musical *characteristics* that repeat most commonly in the songs are slow tempos, major modes, and strong rhythms. This aligns with the clip most selected, Clip 5, which was a slow, major clip with a strong rhythm.

The consistent intention for song selection while recalling a fearful emotion was alteration towards a more positive or calm emotional state. Lyrics were mentioned as the most important reason for anxious song selection.

Participants explained that they would prefer to select songs that made them feel “calm,” “comfortable,” and “safe.” Furthermore, “good memories” was also mentioned, which is related to the cognitive processing of positive nostalgia. A positive feeling of nostalgia can enhance a listener’s attitude towards a song, creating a highly likelihood of fully listening to a song,



especially when they are seeking comfort (Marchegiani & Phau, 2011). Some songs brought memories of a time when the individual experienced something good and bringing them back to this moment brings them comfort.

The most consistent musical *characteristics* between clip selection and song selection were slow tempo, major mode, and strong rhythm. Most individuals who selected a slow, major clip with a strong rhythm also selected a song that had these *characteristics*. The most consistent characteristic was rhythm, which was found to be consistent 14 times, followed by mode at 11 times. This shows that listeners prefer strong, predictable rhythms in a major mode with a slow tempo when feeling anxious for bringing calmness and comfort.

#### **4.4 Happiness**

The interview ends with this emotion so that the participant would leave the interview with a smile, rather than lingering on some other negative emotion. This emotion was the most consistent of all emotions, and all participants enjoyed this section. Since this is a positive emotion, the objective was to evoke this emotion alongside the emotional stimulus song: Carmen Suite No. 1: 5. Les Toréadors. The song is fun, upbeat, and sometimes described as “goofy,” which resonated with the participants very well.

##### **4.4.1 “Happiness” Playlist Selection**

Thirteen participants consistently chose Playlist 6 (Feel Good Happy Mix). This playlist is a Spotify-curated playlist specifically for the listener, which is designed for listeners to select when they are feeling happy. Participants were easily able to perceive this, and some even recognized it from their

listening. They viewed this playlist as increasing their happiness when they were already feeling happy.

Playlist 6 had a very calming light green color that resembles nature-like green. They felt this playlist would best represent their emotions when they are feeling happy. Playlist 4 (Happy song everyone knows) is blue with a bright yellow image. Participants noted that this playlist was “too bright” and would rather select the playlist with more “chill” atmosphere. Additionally, Playlist 4 was paired with a picture of an individual that was seemingly happy. This did not resonate very well with individuals, because it furthered the idea that this playlist was overly “happy.” The color was not a primary reason for selection, although it did influence two participants.

All participants made their playlist selections to regulate and increase their emotions of happiness. No participant sought to change this emotion into a negative emotion. Some individuals selected playlists with other emotional primes, such as Playlist 2 (Rage Mix), which they explained was because they want to listen to the type of music they enjoy when feeling happy. Rage Mix is perceived as having fast, metal types of songs, so this selection is influenced by genre. Most selections were based on the title of the playlist, as it generated a perception of what the playlist contained. Additionally, individuals made their selection since the playlist was a Spotify-curated playlist because they knew it was designed specifically for them. The “mood” and “familiarity” also had an impact on their selections, while “bright” and “calm” colors were mentioned as well.

#### **4.4.2 “Happiness” Piano Clip Selection**

Clip 1 (Time by Tony Ann) was found to be the most likely to be selected. This clip is a fast, major clip with a strong rhythm and was chosen nine times. This is followed by Clip 3 (Blessings by Austin Farwell), selected five times, and Clip

2 (I Miss That Time by Austin Farwell), selected four times. All these clips have a fast tempo, which seems to be the strongest musical characteristic in influencing music streaming decision-making when a listener is feeling happy.

The intention for clip selection was perfectly consistent, with all participants stating they would make their selection to regulate their happiness. The fast tempo was the most frequently mentioned reason for their selection, as well as a perception of the song sounding “happy.” Individuals stated that the “energy” and “vibe” of the clip influenced their selection as well. Overall, individuals seem to want to select fast, major clips with a strong rhythm that sound “happy” and have “energy.”

#### **4.4.3 “Happiness” Piano Clip Skipping**

Clip 7 (Smile More (Slowed) by Austin Farwell) was most likely to be skipped. It is a slow, minor clip with a strong rhythm, and was skipped six times. Clip 4 (Anxiety by Tony Ann) and Clip 6 (Grief by Tony Ann) were also skipped frequently, where Clip 6 is like Clip 7 in slow tempo. Additionally, Clips 7 and 6 were most likely to be selected when respondents were feeling sad. This shows that listeners would be most likely to skip songs they would listen to when they are feeling sad. The slow tempo seems to be the strongest musical characteristic influencing song skipping when individuals are feeling happy. All individuals intend to skip clips to avoid emotional alteration. They want to immerse themselves in happiness rather than altering this emotion to a negative emotion. The clips skipped were done so because they were too slow and described as “sad.” Participants mention they skipped these tracks because they made them feel “anxious” or “depressed.” Overall, happy individuals are most likely to skip slow songs that sound “sad” and evoke negative emotions.

#### 4.4.4 “Happiness” Song Selection

The dominant *characteristics* found in the participant’s song selection were fast tempo, major mode, and strong rhythm. Thirteen individuals selected songs with these *characteristics*. Not only does this align with the literature, but it also aligns with the clip selection. Clip 1’s song *characteristics* are fast tempo, major mode, and strong rhythm, so there is a strong connection between these *characteristics* and music streaming intentions for happy individuals.

All individuals made their song selections to regulate and enhance their happiness. The primary explanation given by participants for their selection was that the song sounded “happy” to them. Lyrics were the second most important for individuals because they made them feel happy, they could sing along with positive-sounding lyrics. Furthermore, the “energy” and “rhythm” were mentioned as reasons for their song selection, as they helped heighten the emotion.

The emotional intentions were perfectly consistent between song and clip selection, which was regulating the happiness. Additionally, there was a strong consistency between song selection and piano clip selection *characteristics* in fast tempo, major mode, and strong rhythm. This shows that happy individuals have a strong preference for listening to songs that have these song *characteristics*. Overall, happy music listeners are most likely to listen to songs that have a fast tempo, major mode, and strong rhythm for regulating and enhancing their happiness emotion.

## 5 Conclusion

The digital music streaming decision-making process varies person-to-person, as everyone subjectively interprets and understands their emotions differently. However, this study unveiled consistencies amongst Western

Generation Z university students in their selection process when experiencing the certain basic emotions of sadness, anger, fear, and happiness. These consistencies are found in both playlist selection and song selection, as well as emotional intentions for decision-making on digital music streaming applications. This shows that individuals who seek to regulate one of their emotions through music may also seek to alternate another emotion with music listening. Past studies have analyzed music listening intentions based on positive and negative emotions, but not all negative emotions were found to have consistent intentions. Fear was primarily found to be alternated, while sadness and anger were found to be regulated.

### **5.1 Sadness**

Individuals experiencing sadness intended to regulate their sadness. They sought out playlists with emotional primes that related to their emotion. The darker colors of playlists were preferred by sad individuals, which is in line with the research done by Hemphill (1996) where darker colors were associated with negative emotions more frequently. They intended to listen to songs with slow tempo and strong rhythm and skip songs with fast tempo; in line with Gagnon and Peretz's (2003) research that slow tempi are related to sad emotions and fast tempi with happy emotions. However, modality did not influence the listener's decision-making. Fourteen of the songs selected by participants were in a major mode, which contradicts the literature (Bowling, 2013; Cooke, 1959; Fang et al., 2017; Kastner & Crowder, 1990; Lin et al., 2014) that suggests major modes are generally associated with happy emotions. This could be explained by the fact that tempo takes precedence in sad emotional music streaming selections (Bella et al., 2001).

Throughout the interviews, participants were not asked to analyze songs for their musical *characteristics*, but rather determine what they would choose without consciously thinking about tempo, mode, or rhythm. This would

strengthen the idea that a song with a slow tempo and strong rhythm, yet a major mode, can be perceived as a sad song. In addition, participants put a heavy emphasis on the importance of lyrics to them when they were feeling sad for relatability and memories. Although lyrics were outside of the scope of this study, it is important to note how frequently this came up. The lyrical content may also be an explanation for the oversight of modality in sad emotional music selections. Overall, individuals experiencing a sad emotion are most likely:

- Select a playlist with an emotional description that matches their emotion for the purpose of emotional regulation.
- Select a song with a slow tempo and strong rhythm for the purpose of regulation.
- Skip a song with a fast tempo.

## 5.2 Anger

Individuals who experience anger showed a preference for regulating this emotion, generally for the purpose of “getting it out” and “moving on.” Angry individuals showed a strong preference to select a playlist that described anger in the title, which was Playlist 2 (Rage Mix), as they felt it would match their anger. Additionally, Playlist 2 has the darkest color of all playlist options, solidifying participant’s decision and aligning with Hemphill’s (1996) work of dark colors being associated with negative emotions. In the clip selection portion, there was a very strong preference for the clip with a fast tempo, minor mode, and weak rhythm; additionally, individuals had a preference to skip songs with a strong rhythm. When compared to the song selection *characteristics*, the two most consistent musical *characteristics* were a fast tempo and a weak rhythm. This is consistent with the literature and past research that individuals seek to regulate their anger and listen to music that matches their emotion (Sharman & Dingle, 2015). Fast tempo and weak unpredictable rhythm are frequently found in metal music and are known to

match the emotions of an angry listener, which eventually leads to a more positive mood (Sharman & Dingle, 2015).

The musical mode has not been found to have a significant impact on music selection when individuals are feeling angry, which is consistent with past research as well (Elliott et al., 2011). The participants in this study reflected on this intention to regulate their anger and stated that anger was easier for them to regulate to eventually improve their emotional state. Overall, individuals experiencing an angry emotion are most likely to:

- Select a playlist with an emotional description that matches their emotion for the purpose of emotional regulation.
- Select a song with a fast tempo and weak unpredictable rhythm for the purpose of emotional regulation.
- Skip a song with a strong predictable rhythm.

### **5.3 Fear**

Individuals who experienced fear were found to seek emotional alteration from their fearful or anxious emotional state towards a more calm and relaxing emotional state. This is consistent with the findings of Elliott et al. (2011), who suggest that individuals feeling anxious while listening to music would be most likely to listen to slower music that calms them. This can be seen in the fearful emotional preference to select a playlist that has a title resembling the calming of their fear or anxiety. Participants preferred selecting Playlist 3 (Anxiety Relief), which gave them the perception of slow and relaxing music. The color of this playlist influenced the decision-making, as it evoked and primed more calming emotions than Playlist 7 (Anti Anti Anxiety Mix), however, the orange color contradicts the findings of Kaya and Epps (2004), where they found that blue and purple generally were found to be the most calming. This can be explained by the preference for the image shown on Playlist 3 of a backpacker in nature paired with the orange color,

which participants found primarily calming. Furthermore, there was a preference to listen to the slow, major clip with a strong rhythm, while there was a preference to skip clips with a fast tempo because it felt overwhelming. Songs with a slow tempo, major mode, and strong rhythm were found to be the most consistent between clip selection and song selection.

The slow tempo and strong rhythm are consistent with the findings of Elliott et al. (2011), as these musical *characteristics* bring a calming feeling to listeners. The strong rhythm was found to bring comfort to the listeners since it was predictable. This was something they sought out when experiencing fear since they perceived fear as something that was uncontrollable and unpredictable. Additionally, the major mode was found to be preferred when experiencing anxiety. Although this contradicts Elliott et al. (2011), this could be explained by Hoshino's (1996) suggestion that major modes portray a bright and joyful sound. Thus, the individuals in this study seek to listen to bright and joyful sounds with the intention of seeking relaxation and calmness. Overall, individuals experiencing an angry emotion are most likely to:

- Select a playlist with an emotional description that offers a solution to alternating their fearful or anxious emotion.
- Select a song with a slow tempo, major mode, and strong predictable rhythm for the purpose of emotional alteration.
- Skip a song with a fast tempo.

#### **5.4 Happiness**

When individuals were experiencing happiness, they were most likely to make music-streaming decisions with the intent of regulating their happiness, which is consistent with Saarikallio's (2011) findings. Happy individuals were found to prefer playlists with a description that resembled their emotions. Playlist 6 (Feel Good Happy Mix) because they perceived this playlist as



having happy-sounding music. The light green color of the playlist was also noted to influence their selection, as it brought a calm and “chill” perception of this playlist. This is consistent with Hemphill’s (1996) study that showed green to evoke positive and happy emotions, as individuals related it to the greenery of nature. Happy participants were most likely to select fast, major clips with a strong rhythm because it enhanced their positive emotions; they were most likely to skip slow, minor clips with a strong rhythm because it brought their positive emotions down. Additionally, happy individuals were most likely to select fast, major songs with strong rhythms, which is consistent with the clip selection music *characteristics*.

These findings align with Gagnon and Peretz’s (2003) research that fast tempi are generally perceived with positive emotions because it matches the emotions of the listener, and Lin et al. (2014) determined that fast tempi paired with a major mode generates positive emotions. In addition, this supports the findings of Hoshino (1996) that major modes portray joyful and bright sounds, which are primarily what listeners are seeking when feeling happy. Finally, this also is consistent with the findings of Scherer & Coutinho (2013), where a strong rhythm is found to enhance the perceived subjective emotion of a song. Overall, individuals experiencing a happy emotion are most likely to:

- Select a playlist with an emotional description that matches their emotion for the purpose of emotional regulation.
- Select a song with a fast tempo, major mode, and strong predictable rhythm for the purpose of emotional regulation.
- Skip a song with a slow tempo and minor mode.

## **5.5 Recommendations for Future Research**

The findings from this research are apropos to the suggestion algorithms in digital music streaming applications and Artificial Intelligence (AI) training

and development. By interpreting the listening patterns of individuals, a streaming algorithm paired with AI technology could better suggest new music to listeners based on their assumed emotional state in congruence with the song *characteristics* and playlists associated with the selected songs. Predicting and determining emotions would be a limiting factor to furthering the development of suggestion algorithms; however, if paired with AI technology, algorithms could aim to determine emotions based on listening history, facial expressions, or geolocation to make more accurate suggestions. This research is also important to the field of music behavioral therapy where the goal is to improve the emotional state of individuals experiencing certain negative emotions by using music listening.

Further research into this subject should revolve around gaining a deeper understanding of more specific areas of the emotional intentions of music listening. A better understanding of why variations exist between certain users and their emotional intentions will come through song selection. For example, the results of this study found that some users seek to alternate, regulate, or avoid certain negative emotions. Identifying the *characteristics*, emotional experiences, or demographic variables behind these variations could yield a greater understanding of emotionally-induced streaming decisions. More specifically, comparative research could be done trans-continentially and intergenerationally to see how different geographic and age demographics make emotionally-induced streaming selections.

Furthermore, researching the streaming intentions of individuals when they are experiencing complex emotions will assist in better understanding emotionally-induced song selection. Finally, analyzing the influence of external factors (e.g., geolocation features or weather and how they impact emotions) on emotionally-induced music selection behavior will allow streaming applications to use external data to help influence the suggestion algorithms.

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