

Creative Music Production,

Redmond Bonar, Nathan

**How does the difference in tempo between different songs effect the
listener's emotion?**

27th of April 2026

Mentored by David Christophers

Declaration

I hereby certify that the material, which I now submit for assessment on the programmes of study leading to the award of BA(Hons) in Creative Music Production, is entirely my own work and has not been taken from the work of others except to the extent that such work has been cited and acknowledged within the text of my own work. No portion of the work contained in this thesis has been submitted in support of an application for another degree or qualification to this or any other institution.

I have used the IADT library referencing guidelines (available at <https://iadt.libguides.com/referencing>) and/or the appropriate referencing system recommended in the assignment guidelines and/or programme documentation.

I understand that the IADT regards breaches of academic integrity and plagiarism as grave and serious.

By signing this form or by submitting material for assessment online, I confirm that I have read and understood the IADT Academic Integrity Policy (available at <https://iadt.ie/wp-content/uploads/2024/03/Academic-Integrity-Policy-V1-2024.pdf>).

Nathan Redmond Bonar
Signature of Candidate

24.04.2026
Date

Abstract:

This study focuses on how the difference in tempo in music and how it interacts with the listener and the difference with engagement by using opposing tempos with two songs inspired by the reference genre of Nu Metal. Included in this paper is a literature review with of the genre selected, changes within the genre of metal music, the psychology behind tempos and modes with human interaction and the ability to recognise tempo as well as the knowledge of mixing within the metal genre. The methodology section of the project includes the procedures of recording a performing band in a professional studio, editing, mixing and mastering to produce the two tracks and two surveys that were delivered to several participants.

Contents:

Introduction	5
Literature Review	6
Brief historical content of the genre.....	6
Changes within the original genre of metal music.....	6
Ability of recognising tempo and the importance with engagement.....	8
Knowledge of mixing the Nu-Metal Genre.....	10
Methodology	13
Pre-Production.....	13
First day of recording.....	13
Second day of recording.....	15
Analysis	17
Discussion	19
Conclusion	21
Appendix	22

Introduction:

How does the difference in tempo between professionally produced songs affect the listeners' engagement. This paper will demonstrate the findings off the hypothesis above by examining academic literature, researching references for songs with different tempos and gathering secondary data through surveys of a wide selection of participants throughout the project's life span. This research will pay contributions to the progression in musical composition and the subjective aspect of how music can change and alter a person's engagement whether the effect of the songs is more positive or negative. This research paper and methodology will focus on Nu metal as a reference genre for experimentation with creativity. This interest in researching tempos occurred from live crowd reactions to varying compositions performed. The initial assumption, from the ensemble of performers, categorised slower tempo compositions to elicit a crowd response being unresponsive and relaxing. Faster tempo songs appear to evoke energetic and motivational. The primary goal of research and this and project is to investigate how and why a song of faster or slower tempo would dictate or change a person's engagement and experience of music presented.

The process of this project includes a performing band that were given two songs to practice before the recording process began in a professional studio, these tracks were then edited and mixed to an industry standard as well as manipulating the tempo within the songs for survey research data. To test the dictation in the engagement of participants, two different versions of surveys were distributed, the first survey contained one song played at two different tempos and the second survey contained two different songs played at two opposing tempos. This method was used to determine if the tempo influenced the participant or the song.

As noted above, the reference genre above has been researched involving the history of its origin, the changes and progressions of the metal genre as well how the tempo changes have kept the listener's engagement over its life span.

Literature Review:

Brief historical content of genre:

What is Nu Metal? The Nu Metal genre appeared in the 1990's as a sub-genre of metal music and is considered "a less aggressive form of death metal". As researched in the paper, "Affective masculinities and suburban identities: Nu-metal as reflexive art" (Porcello, Niccolo)¹ quotes Johnathan Pieslak describing nu-metal as "characterized by aggressive, rap-influenced, angst-ridden, and pitched yelling vocals, hip-hop style beats or drum samples, and heavily distorted, detuned guitars played largely syncopated, riff based music with a distinct absence of solos and overt displays of instrumental virtuosity." The main and most popular bands in this style of music are Korn, Slipknot, Limp Bizkit, Linkin Park (featuring in 2000) and Deftones. As the main reference of this project and its exploration into tempo by using the genre of Nu Metal music, the focus is directed at Deftones. Sometimes dubbed as the "Radiohead of metal", they formed in Sacramento, California in 1988. It was founded by Chino Moreno, Stephen Carpenter, Abe Cunningham and Dominic Garcia. Below we can see the changes over the original genre over the years.

Changes within the original genre of metal music:

As recognised by Volak, Vojtech (Heaviness: A Key Concept of Metal Music Through The Lens of Deleuzian Philosophy) "Heaviness as a term for sound quality appears in many works about metal music and is subject for theorizing."² Other writers that are mentioned in this paper above (Herbst 2017-2018, Kahn-Harris 2007; Mynett 2012, 2013) have observed the "Distorted guitars and different tunings-as key to perceptions of heaviness throughout the history of metal music. Some argue that metal music becomes heavier over time". When examining and inspecting expression of this sub-genre of metal music Smialek, Erik (Genre

¹ Porcello, Niccolo. Vassar College Digital Window @ Vassar Affective Masculinities and Suburban Identities: Nu-Metal as Reflective Art. 25. Apr. 2016.

² Volak, Vojtech. "Heaviness: A Key Concept of Metal Music Through the Lens of Deleuzian Philosophy." *Annales Universitatis Paedagogicae Cracoviensis: Studia de Cultura*, vol. 14, no. 3, 2022, pp. 53-62.

and Expression in Extreme Metal Music, ca. 1990-2015)³ in chapter 2, the question is proposed as “ “What is extreme metal?” differently by focusing primarily on what its fan believe it not to be”. He states in his second chapter the goal is to “Investigates how the discourse of fans, journalists and musicians alike define extreme metal against certain subgenres and social categories that lack prestige within the scene”.

“These connections are evident in the racial tensions surrounding nu metal and its appropriations of hip-hop culture”. This is an interesting take on the genre of nu metal itself due to the beliefs of culture appropriation from “original metal heads” leaning into the idea of this fusion of music is not particularly liked within the scene itself. But by surprise Nu metal music became mainstream in the 1990’s with producer Ross Robison being labelled by journalists as the “Godfather of Nu-metal”, encouraged vocalists to make their performances reflect their own personal anguish.” The most important variable about this genre is the “appeal of rooting in its assimilation of rap, electronic dance music and other styles, displacing metals prior emphasis on instrumental virtuosity to instead emphasize rhythmic groove”.

Upon researching the variable of groove within this genre the question sparked of “What are the structural factors of the music that give rise to a sense of groove?”. According to “The Psychology of Music: Rhythm and Movement”, (Levitin J. Daniel, Grahn A. Jessica, London, Justin)⁴ as stated in their hypothesis for this question “Given groove is correlated with a strong sense of felt beat, groove is sensitive to tempo.” Also interestingly noted they say that “groovy music tends to fall within a moderate to quick tempo range (100-130bpm)”. When reviewing their section regarding “Groovy Structural Factors: Swing and Syncopation” they examined two other structural factors which are rhythmic complexities and expressive timing (swing), “Both are thought to influence groove because the listener must make a greater effort to follow the rhythmic flow than would be the case with a simple and wholly predictable series of durations performed with a deadpan timing”. To simplify this quote, they insist that both things are believed to enhance the groove of the music because the

³ Smialek, Eric. “Genre and Expression in Extreme Metal Music, Ca. 1990-2015”

19 Apr. 2016.

⁴ Levitin, Daniel J., Grahn A. Jessica, London, Justin. “The Psychology of Music: Rhythm and Movement.” Annual Review of Psychology, vol. 69, 2018, pp. 51-57.

variables make the listener pay more attention to rhythm of the music than if it were to be more of a predictable beat with even timing which is also simple but can be boring and less engaging.

Although groove and rhythm are important for capturing the listeners attention, what the research of this paper entails specifically is the interest in how tempo changes or determines the engagement of the listeners in question.

Ability of recognising tempo and the importance with engagement:

In the relevant study “A developmental study of the affective value of tempo and mode in music”, (Bella Dalla Simone, Peretz Isabelle, Rousseau Luc, Gosselin Nathalie)⁵ decided to test if children have the same concept of mentally distinguishing when feeling a certain emotion towards music, this involved 32 pieces of music (16 major and 16 minor) taken from pre-existing music along with the mode of the song and most importantly for this proposed paper, they judge and examine tempo in the songs too. In the first experiment performed all participants were adults and both male and female, excerpts were drawn from Western music, they were also selected so that half of the pieces had a sense of euphoria, and the other half had a sense of desolation. “Happy sections were played at a fast tempo and were written in a major mode (e.g. ‘Brindisi’ from Verdi’s ‘Traviata’); sad selections were played at a slow tempo and were written at in a minor mode (e.g. Albinoni’s ‘Adagio’), and for all participants these were played at random. The results and findings for their first experiment “did not reveal any effect of sex and order of conditions not any interaction with the factors of interest” in simpler terms they did not find any difference in judgement of tempo and mode when it comes to examination of both male and female participants, meaning the sex of the person became irrelevant to this study. In their second experiment they chose to examine sixty-seven French speaking children. The sample they used included six 8-year-olds (four males and two females), eight 7-year-olds (four males and four females) and eight 6-year-olds (four males and four females). “As these children were the first to be tested and all exhibited similar patterns of responses, they were grouped together in a single 6–8-year-old category.” When comparing experiment 1 and 2 they made the decision to keep the same

⁵ Dalla Belle, Simone, Peretz, Isabelle, Rosseau, Luc & Gosselin, Nathalie. “A Developmental Study of the Affective Value of Tempo and Mode in Music”. *Cognition*, vol. 80, no. 3, 2001, pp. B1-B10.

materials and conditions to have a fair contrast in their findings, but as an observation noticed, “3 and 4-year-olds were unable to maintain focused attention for the entire duration of the experiment. Therefore, these children were presented with 16 excerpts per condition (eight happy and eight sad) instead of 32.” In their general discussion for this study, “The present findings confirm that from 5 years of age, children are able to discriminate between happy and sad excerpts. To do so, 5-year-old children exclusively used information about tempo, whereas 6–8-year-olds, like adults, utilized both tempo and mode.” This study has experimented and proven from a young age how the human brain can recognise and acknowledge how different modes and tempos.

“Nonetheless, it is remarkable that by the age of 6, children show a full knowledge of the rules that govern the happy-sad characteristics of surrounding music.” Luckily for this proposed paper and analysis through methodology this is an ability clearly proven to be developed as an adolescent and highly unlikely to alter over time, it also demonstrates the use in tempo modulation to distinguish different engagement with participants.

Another study was also performed in China of “Music tempo modulates emotional states as revealed through EEG insights” (Yang Zengyao, Su Qiruo, Xie Jieren, Su Hechong, Huang Tiarnrun, Han Chengcheng, Zhang Sicong, Zhang Kai & Xu Guanghua)⁶. An EEG examination is a test that measures and records the brains electoral activity using sensors that are placed on the scalp. “Music can effectively influence human emotions, with different melodies and rhythms eliciting varying emotional responses. Among these, tempo is one of the most important parameters affecting emotions.” A total of 26 participants took part in this experiment without any history of psychological disorders, they used classical piano arrangements at different tempos to experiment with, (56, 106 and 156 bpm). Whilst performing their research it has shown that “the tempo of music can significantly affect human emotions. Fast-tempo music is commonly associated the excitement, liveliness, joy and pleasure, while slow-tempo music is often linked to calmness, dignity, tenderness, boredom and disgust.”

⁶ Yang, Zengyao, Su, Qirou, Xie, Jieren, Su, Hechong, Huang, Tiarnrun, Han, Chengcheng, Zhang, Sicong, Zhang, Kai & Xu, Guanghua. “Music Tempo Modulates Emotional States as Revealed through EEG Insights” *Frontiers in Neuroscience*

Any interesting question to ask ourselves is why do we feel energetic listening to faster pace songs in comparison to slower? Can this aspect in music improve our health in well-being? Noticed by Dr. Jowinn Chew, “It lifts our spirits, gives us energy and gets us moving”, he also quotes “We listen to music that we like and our brains release dopamine. Often known as the ‘happy hormone’, dopamine not only improves our mood but also helps us to concentrate better on what we are doing”. She also explains “Studies have shown that people tend to synchronise their movements to the tempo of their music that they are listening to.”⁷ But in comparison slower paced music “can quiet your mind and relax your muscles, making you feel soothed while releasing stress from your day. Music is effective for relaxation and stress management”.⁸

Knowledge of mixing the Nu-Metal Genre:

As we have now reviewed and researched the referenced genre, the history of it changing over the years and how tempo in music has been experimented with to test an individual's engagement, we will now look at the study in which the genre is actually produced in correlation to the methodology of this project. The information researched in “Nail the Mix: Standardization in Mixing Metal Music?” (Mynett, Mark & Herbst, Peter-Jan), when discussing the mixing process “It starts with the fundamental mixing decisions and contextual observations, then moves to individual instruments, and ends with the tools used. The focus in on the rhythm section of drums, guitars and bass. There is a natural variance in mixing due to drastically different vocal styles (Kennedy 67-69), timbres and space within arrangements.” This means they start with basic mixing decisions and then move on to the individual instruments within the mix. With dissecting the individual instruments to mix they start with the drums, “Standardization in the mixing of drums was examined in terms of routing and signal flow, processing, samples, gating and treating spill from other drum components captured by spot microphones.” They also mention how some producers focus

⁷ “How Music Helps Us To Run Faster.” Wings for Life World Run, 11 Apr. 2023.

⁸ “Releasing Stress Through The Power of Music.” University of Nevada, Reno Counselling Services – Virtual Relaxation Room, University of Nevada, Reno.

on individual tracks within the drum kit by using group busses mainly as volume faders and by having samples recorded the kit to replace any hits that weren't strong enough (ghost hits) to sit in the mix as well. A mixing technique that was mentioned was parallel compression, “the use of parallel compression significantly impacts the drum sound by supporting gently compressed drums with a heavily compressed copy.” By using this it can increase the perceived energy of the performance without jeopardising the clarity of the recording. Notably, they say that producers spend less time on guitars “because they are convinced that most of the sound is created in the recording”, and the final statement that was spoken about on guitars was “Altogether, processing options are limited because the guitar’s sound is largely determined before the mix begins.” Finally, the bass is discussed as the last instruments stating that, “The bass sound is commonly less constructed during the recording stage, reflected in many mixes where only a direct signal (DI) is available. The bass sound is a creation of the mix” also discussed was potential plug-ins used. “Popular amongst producers using Pro Tools is the stock bass amplifier simulation SansAmp PSA-1.” The tools that were mentioned in regard to mixing were an equalizer, multi-band compression, Fab-filter and also a limiter L1.⁹

After doing extensive research into this field, a meeting with organised with the thesis supervisor in discussion to pre-production.

“It is integral to the newer producer in the Nu Metal genre to access how the song will mix *prior* to recording. This can only be achieved by choosing references in preproduction to guide both the recording and the mixing process. Completing a professional mix in a genre requires a firm understanding of the genre’s tropes.” - David Christophers. This ensures that the research performed for mixing aspect of this project must be crucial considering that a reference genre has been included. This research includes mixing techniques within the selected DAW (Pro Tools), what microphones to use for which instruments, the correct level

⁹ Herbst, Jan & Mynett, Mark. (2021). Nail the Mix: Standardization in Mixing Metal Music?. *Popular Music and Society*. 44. 1-22

of equalization (EQ), compression, limiters, levels of the overall mix and the ability to comp vocal takes and editing applied.

Upon review of literature on the topic of tempo and how to professionally mix this genre, the plan of this project is to use the knowledge of how changing tempo can change the way a listener can be engaged by using the genre of Nu Metal to write two songs in two opposing tempos to test in if this is true. Data will be collected through a short survey in which the listener will be given a version of a fast and slow tempo song.

Methodology:

This project has an aim to experiment and test two original songs with opposite tempos to determine and find out how does it affect the participants engagement. How this research was performed is by having a live band being brought into the studio with two original songs written about the projects selected songs for comparison. The two different songs are in references to the band Deftones, the two examples were used to carry out this hypothesis is **“My Own Summer (Shove it)”** and **“Digital Bath”**. The reason for these songs being selected is due to the vast differences in tempo, **“My Own Summer (Shove it)”** having a tempo of 147 bpm in comparison to **“Digital Bath”** being 96 bpm.

Pre-Production:

Before starting this research, the performing band (“A Dead Human”) was selected because of the juxtaposition of their genre style, although the reference genre selected is Nu Metal the creative decision was made to choose a punk band to see if they can replicate the genre in its writing style. While the band were being interviewed for the pre-production of this project, they mentioned that two songs were already practiced and written in reference and their preference for recording was live tracking. This means that the band want to in unison together whilst being recorded to achieve this they will be playing in Studio 1 in the live room with a desk engineer present. The band agreed to bring their own instruments, pedals and drum breakables but they have also been asked to research “Deftones” tones to really emulate the references chosen, this includes guitar tunings and different pedal settings as well. Although the performing band are used to playing in unison together whilst live tracking, it came to the agreement of the sake of the project the band entered the live room one by one to record each individual track necessary for the two songs with a click to ensure that everything is within the tempo as reference and there was no bleed of the instruments.

First day of recording:

To ensure that tempo was focused on and prioritised for this project’s recording, the first day in the studio was focused on the drums. Before stepping foot into the studio live room, a

ProTools session was prepared with a click at 147 bpm and a midi guide track of a simple kick and a snare, as well as bass and guitar guide tracks as the drummer requested to listen to in the live room through a pair of headphones to play along to. Upon the research to perfectly match the references for the drummers recording, a list of microphones used on the referenced song (**“My Own Summer (Shove it)”**) was discovered and applied to the set-up of the recording. The microphones used in reference were a Seiheser MD421 for Kik In and both toms, a FET 47 was used for Kik Out, a Shure SM57 was applied for snare top and bottom and OH (Overheads) were Neumann U87's or 414's. Unfortunately, the studio provided did not have all the microphones, so these were substituted as follows. Kik out was replaced with an E902 and OH (Overheads) was replaced with Lct 140's.

(See Appendix 1)

All microphones were gained in accordingly and an intentional balance mix was made for the drummer as requested for his headphone mix. Research into the bass and electric guitar were as important for this project as well. The information that was found for the bass guitar included a Fender Jazz or Percussion bass that was recorded through an Ampeg Bass amp that also used heavy distortion and was recorded using an SM57 or an MD 421. Bass was recorded on the same day in the control room to ensure that there was no bleed whilst the drums were being recorded. When it came to recording the bass for this track unfortunately the studio did not have the Ampeg bass amp so an Orange Crush 100 was used instead and an MD421 was applied to the centre of the amplifier, for the bass itself a Harley Benton Jazz bass was used for recording and performing. The guitar used in the recording of **“My Own Summer (Shove it)”** was an ESP 7 string guitar equipped with Seymour Duncan JB pickups going through an ADA MP-1 preamp and a Marshall 9200 power amplifier. The guitar was substituted with a Yamaha strait with a double humbucker in the bridge, but it did run through a Marshall 9200 that was present in the studio at the time. Fortunately, the guitar was recorded with an SM57 and the studio had that microphone available.

A problem that appeared was the sound of the guitar recording in the first song (**“Can't Sleep”**), there was no DI signal recorded so there was no clean recording in the session to go back and modify, and there was also lots of feedback so the decision was made to return to the studio and re amp and rerecord the guitar tracks. The microphones that were used through this process were a SM58, SM57, RB500 and TLM800; these were positioned for one microphone to sit facing each speaker cone inside the Marshall cabinet supplied by the

recording studio. The same procedure was used with the rerecording of the bass guitar as well. The microphone used for the bass guitar were an MD421, SM57 and a RB500; these were positioned only bottom left, bottom right and finally the top right. As well as this, the guitarist played three takes with a click track to ensure that the recording was in time with the rest of the session.

Second day of recording:

The second day in the studio was the recording of the second song which features the tempo of **“Digital Bath”** but the drummer struggled to stay in time so the conversation was had between the desk engineer and the performer to compromise and change the tempo to 98 bpm instead. The same microphones were used as the first day to ensure the same sound could be recreated as well as the placement of the microphones. The performing band had a few more creative ideas they decided to apply to the second song due to the atmospheric reference, this featured an acoustic budget guitar (Harley Benton acoustic guitar) which was recorded in a live room with an SM58 and an E902 for the duration of the song which was accompanied by a reverb plug in as well as this the bass player decided to add a delay effect on the introduction section of the song as well as a fuzz plug in, this was recorded plugged straight into an interface to ensure there was no bleed in the recorded tracks. The guitarist was asked to only play the electric guitar (American made Fender Stratocaster) in the chorus only to allow more room in the mix as the band and the desk engineer agreed to have a juxtaposition between the two songs.

The problem that occurred was the overall tempo and timing of the instruments of the entire second song (**“Father”**), due to click not being set to 1/16th notes since the tempo is a lot slower and to play with multiple clicks within the bar is easier to keep in time with (originally 96bpm but changed to 98bpm due to the session drummer being uncomfortable playing to the tempo) the whole of the instrumental was out of time with each other. Due to this dilemma tempo mapping was introduced by unfortunately through trial and error this did not work as a solution so manual editing by bar was the only remedy for this artifact of the project. The drums were completed first as they are the backbone of any instrumental, this included editing them as a group and manually dragging the kick and snare to the correct beat of the bar as well as every tom and floor fill throughout the song, this was included using crossfades edits in the daw used ProTools to ensure that there was no sharp cuts and the edits would

flow seamlessly into one another to ensure the listener's wouldn't know the differences of editing. This was also applied to the rest of the instrumental including acoustic guitar in the introduction, bass guitar throughout the song and electric guitar in the chorus; after the song was edited in time to the tempo 98bpm, the main and backing vocals were imported into this session and edited to fit the timing of the instrumental. This was an extremely lengthy process due to the emphasis of importance on tempo for this project so much so there was worry that the survey wouldn't be completed on time.

After the recording of the two songs was completed, mixing and mastering have been completed in reference to the tempos of the selected tracks mentioned above, **“My Own Summer (Shove it)”** and **“Digital Bath”**. This has been achieved by placing the reference tracks into a chosen DAW which in this case will be Pro Tools

Analysis:

This section of the research highlights and focuses on the listeners' emotional response of the surveyed data and the outcomes of the methodology. This include two compositions with the performing band “A Dead Human” that feature a fast-paced song at 147 bpm and a much slower paced song at 98 bpm, this was changed from the reference of 96 bpm due to the session drummer being uncomfortable with the tempo so the compromise was to change it; these two tracks have been edited to ensure that both pieces are in time during the production period and elastic audio was applied to manipulate the tempos for research purposes to test the hypothesis of slower songs evoking calmness and relaxation in comparison to faster songs making somebody feel energetic and excited.

As well as these two separate surveys were conducted and presented to two different groups of students.

In the first survey contained the song “Father” which is the composition played at 98bpm. In this survey a group of 13 students were given the original song to listen to as well as the song manipulated to be played at 180 bpm. The survey complied was very short and simple to keep the participants' interested and only included a consent, five questions and a thank you for participating. The first question was asked the preference between faster or slower songs and 54% chose slower, 8% faster and 38% had no preference. The second question that was proposed was “On a day-to-day basis which tempo would you listen to?” and data showed 31% chose faster, 31% chose slower and 38% had no preference to the question. Along with the engagement with faster and slower songs; 69% chose slower and 31% chose faster. Finally, when asked why they are more likely to be engaged with their option selected; the following answered were reported, most participants preferred the slower version because they could understand and listen closely to the lyrics along with emotion portrayed in the song, while others enjoyed the slower version but thought when the vocals disappear the instrumental to fill the gaps. The remaining participants when asked this question just preferred faster paced music as a whole and didn't resonate with the slower version. (See Appendix 2 for data analysis)

The second survey was complied with the original tempo of **“Can’t Sleep”** at 147bpm and the original tempo of **“Father”** at 98bpm. In this survey the same questions were asked but the product given was different from what the first group of people were given, this was used to determine was it the tempo of song that engaged the listener of the song. The first question was asked the preference between faster or slower songs and 38% chose faster, 31% chose slower and 31% had no preference. When asked which are you most likely to listen to on a day-to-day basis, 38% chose faster, 38% chose slower and 23% had no preference. When asked why, the following answers included how faster music motivates them in the gym, what mood they were in, some people preferred both tempos, that higher tempos gave them more energy. Along with the following question after listening to the tracks, which are you most likely to engage with after listening to the tracks given, the answers included; that faster tempos are easier to dance to, faster is easier to head bang to, they can listen to both depending on if they are tired or energised, they prefer slower songs as a whole and expressed a sense of vulnerability when listening to slower songs. (See Appendix 2)

The expectation was to get 30 people minimum for the survey response but unfortunately a limited response of 26 participants also to note the first person was done in person to visually see the contributors to the survey are engaging with the music produced but sadly due to an unexpected leak on the day of the scheduled second survey, it was too dangerous to come and present it in person so it was sent out online for people to participate. But the research shows that faster tempo songs promote being more energetic and engaging when it comes to everyday activities just like the going to the gym, head banging at a concert whereas listening to slower tempo songs evokes a calmness, tiredness and relaxes people instead.

Discussion:

Upon the reflection and analysis of this project we can measure the success of our findings by viewing the survey data to prove that faster tempo songs evoke more engaging reactions such as feeling more energetic and promoted more physical activity in comparison to slower tempo songs that made people feel more relaxed and calm. By giving two different groups the same survey but with different tracks to listen to be a very interesting approach to expand the data, (first survey was "Father" at 98bpm and 180bpm, second survey "Can't Sleep" at 147bpm and "Father" at 98bpm) this idea was to distinguish if listener's engagement relied on the tempo change or the song itself. It was very unexpected to see people enjoy "Father" at 180bpm in comparison to the original tempo at 98bpm because during production when elastic audio was applied to manipulate the tempo, the drastic change was almost laughable when played the first time. But participants really enjoyed the instrumental and the groove of the song a lot more than the version at 98bpm. It was also very fascinating to see visually see people physically move and engage with the faster version, thus proving the hypothesis that tempo changes in music keeps a listener interested and engaged. It was also fascinating to see the work of "A development study of the affective value of tempo and mode in music", (Bella Dalla Simone, Peretz Isabelle, Rousseau Luc, Gosselin Nathalie) being performed in real time to witness the change in reaction when these variables are changed, by introducing a faster tempo song to some does exhilarate them physically where a slower tempo song does the opposite. Another study that was extremely helpful along the way was "Nail the Mix: Standardization in Mixing Metal Music?" (Mynett, Mark & Herbst, Peter-Jan) in this paper gave a phenomenal step by step approach to how you're able to successfully mix and produce a song in a metal genre that can be very versatile throughout the whole style of music. By following the advice given, this allowed for the participants to be able to sit down and listen to two professionally mix tracks in this genre ensuring that the reference tracks and the physical artifact for this project were as close as possible. Tempo change and groove within music seems to keep people interested and we can also see this being proven in "The Psychology of Music: Rhythm and movement", (Levitin J. Daniel, Grahn A. Jessica, London, Justin) they insist that these variables in music are meant to keep the listeners interested and engaged to the rhythm and changes within the songs produced, to have predictable beats with even timing would be boring for the listener and in conclusion, make them disengage. This really helped with the research because it highlighted how to keep people interested with the

work produced, hence why the decision of applying elastic audio to the completed tracks was going to be successful.

Along the way there was a lot of learning involved, especially when it came to professionally producing and presenting the work through a survey. The biggest issue that was dealt with and learnt was manually editing before mixing a performing band that didn't play in time to a click. There was two weeks consistently of examining the drum tracks bar by bar to ensure everything was in time, after those guitars and bass went through the exact same procedure and after vocals were imported into the session and then edited and comped. This was all before mixing was done. If this project were to be repeated, the performing band would be told to play strictly with a click track for the two songs, the drums would be recorded and then edited before the next recording day to ensure that everyone was following the drums, this would've saved the research project weeks of work and time in the process.

If this research project were to be proposed again, the question would be reframed to "Why do people engage more with tempo change?". This research question is a lot more specific to the topic at hand especially since reviewing the survey data, participants found that faster tempo music gave them a lot more energy and motivated them to do everyday activities like going to the gym and the opposite was found with slower songs that relaxed them and kept the calm.

Conclusion:

To conclude this report, the research into the reference genre of Nu metal, the changes of the genre over the years, the psychology behind the movement in music, two studies focusing on tempo changes in music and mixing within the reference genre have been completed. This has resulted in writing two original pieces of music with opposing tempos that have been recorded, edited, professionally mixed and produced along with two surveys' given to participants. The first survey having **"Father"** at 98bpm & 180bpm to test if the same song at different tempos has any effect of engagement and the second survey featuring **"Can't Sleep"** & **"Father"** at 98bpm to determine if the song alone had any effect of engagement as well. The findings have shown that faster tempo songs have more of an involvement when it comes to motivation and promoting energy in a participant in comparison to listening to slower tempo songs that makes them feel more at ease and moderate.

Appendix:

Appendix 1 Day one of recording:







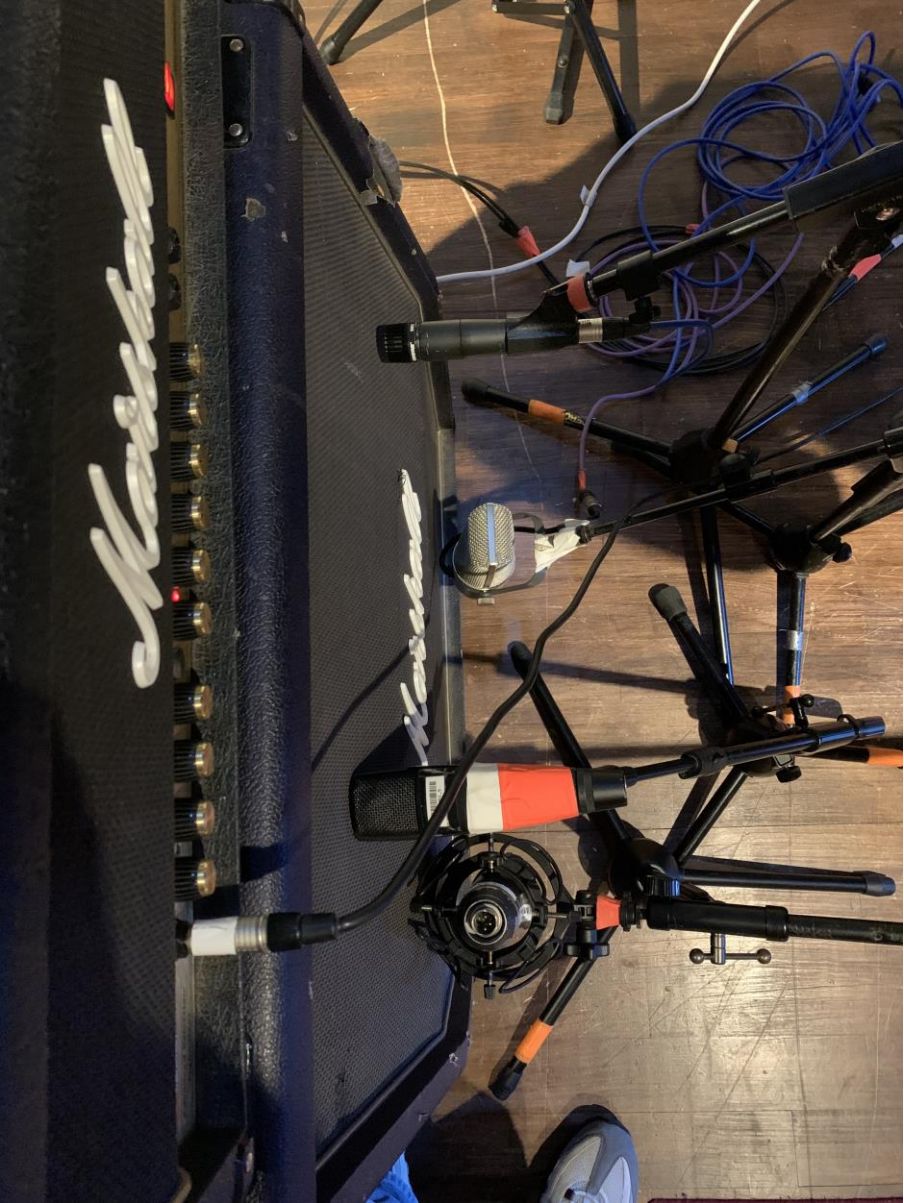
















Appendix 1:

Day two of recording:





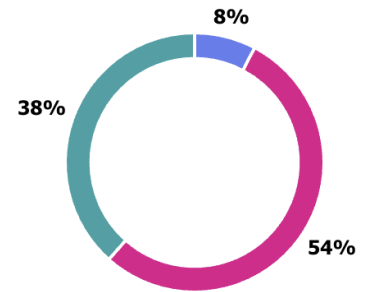


Appendix 2:

Survey analysis, 1st survey data:

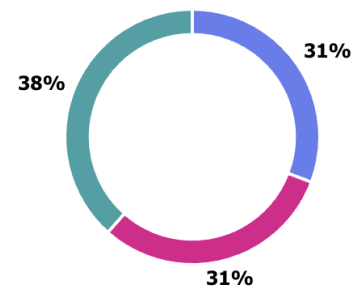
2. Do you prefer faster tempo's in songs or slower?

- Faster 1
- Slower 7
- No preference 5



3. Which are you more likely to listen to on a day to day basis?

- Faster songs 4
- Slower songs 4
- No preference 5



4. Why do you prefer the option you selected above?

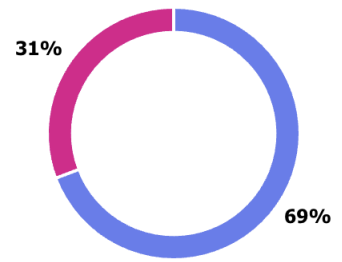
13 Responses

1	anonymous	Can take in all of the elements properly and appreciate them. Especially the background vocal
2	anonymous	The vocals are clearer and the pace of the song is better, however in the faster song in the second part the backing vocals sound better faster
3	anonymous	I like the faster groove and melody it's easier to nod along to and I find more engaging
4	anonymous	More energetic
5	anonymous	Although im a bigger fan of slower music, I find music with faster tempos give me a sense of energy that helps me on my daily commute.
6	anonymous	I think it worked better with the vibe of the song specifically the heavier sections as they felt more cohesive and more punchy
7	anonymous	Depends on the day
8	anonymous	performance felt stronger
9	anonymous	I listen too many genres of music (jazz /bebop,swing/ - blues - metal - rock)
10	anonymous	Not particularly swayed by 1 genre. Speed of song not as Important as all other compositional aspects but must suit the song .
11	anonymous	They are more relaxing and and sensitive
12	anonymous	The music I listen to most days is quite fast because I like it being energetic. There are many slower songs that I love just as much but I don't listen as frequently

13	anonymous	Sounded better but evoked anxiety. I wouldn't choose to listen to either but the first one is better.
----	-----------	---

5. After you listened to the two songs presented, which are you more likely to engage with?

● First song (Slow)	9
● Second Song (fast)	4
● Both	0
● Neither	0



6. Why are you more likely to engage with the option selected above?

13 Responses

ID ↑	Name	Responses
1	anonymous	Easier to nod your head to as it's at a faster pace
2	anonymous	the tempo just feels like it suits the slower song better, but some of the elements sound better or just as good faster
3	anonymous	I prefer higher tempo music
4	anonymous	Has more gravity, suits the mood of the song
5	anonymous	Considering the genre of the piece of music, the faster tempo is more suitable and really compliments the vibe of the song.
6	anonymous	It sounds better to me
7	anonymous	Personally prefer faster metal
8	anonymous	I think the slower version gives more time to react to what's happening in the song
9	anonymous	It was heavier, it had more meaning to me
10	anonymous	Seems to suit the composition more. But perhaps a little faster would suit the gaps between the vocal lines
11	anonymous	You highlight the lyrics more, and chorus parts with backvocals are crazily beautiful in slower tempo. In fast tempo they are melting with everything else.
12	anonymous	For that particular piece I thought the emotion was better conveyed

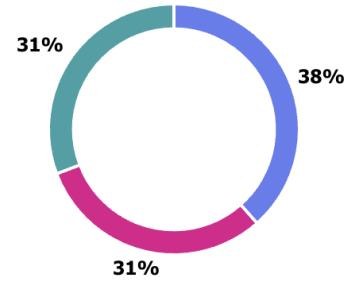
13	anonymous	Engaged with the first one because I could understand the lyrics better even though I preferred the rhythm of the first one.
----	-----------	--

Appendix 2:

Survey analysis, 2nd survey:

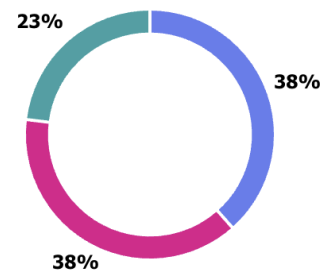
2. Do you prefer faster tempo's in songs or slower?

● Faster	5
● Slower	4
● No preference	4



3. Which are you more likely to listen to on a day to day basis?

● Faster songs	5
● Slower songs	5
● No preference	3



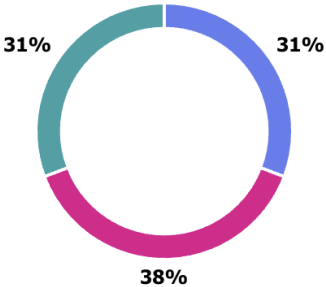
4. Why do you prefer the option you selected above?

13 Responses

ID ↑	Name	Responses
1	anonymous	It make me feel good. It lifts my mood
2	anonymous	Depends really what mood I'm on but seem tired these days
3	anonymous	I like fast and slow
4	anonymous	It gives me great energy listening to faster music
5	anonymous	House oonts oonts
6	anonymous	i tend to listen to sons with a mix of different tempos on a daily basis, it's not something i actively consider
7	anonymous	Have to be in a certain mood to listen to fast tempo songs
8	anonymous	Some days I'll listen to one genre but have a mix of slow and fast songs
9	anonymous	ummm i'm not sure. i would like to say that i listen to music that reflect my personality and pacing in life, which i dont like rushing things. at the same time, i love listening to slow songs and lowkey depressing songs so ya.
10	anonymous	Calming and cathartic
11	anonymous	I enjoy going to the gym helps me be motivated
12	anonymous	I think slower tempo songs have a tendency to have sparser arrangements and this makes the arrangement more focused. They also tend to have more dramatic subject matter; especially lyrically because of this that requires the sparse arrangement to get the listeners attention. Father is a great example of this. The sparse arrangement accompanies the powerful vocal performance which hits the listener directly in an emotionally poignant way.
13	anonymous	I prefer the high energy in faster tempos

5. After you listened to the two songs presented, which are you more likely to engage with?

- First song (Slow) 4
- Second Song (fast) 5
- Both 4
- Neither 0



6. Why are you more likely to engage with the option selected above? This could be listening at home or in a live gig.

11 Responses

ID ↑	Name	Responses
1	anonymous	At home
2	anonymous	at a gig i prefer fast songs
3	anonymous	Feel good song
4	anonymous	It gives me a feeling good feeling and like the.up beat tempo
5	anonymous	i think the faster tmpo suits the song better in my opinion
6	anonymous	I can listen to both depending on how I'm feeling during the day whether it be energised or tired
7	anonymous	i like slow songs. and i think as an introvert, i'd rather listen to songs at home than i. gigs. but if it is a gig, i love intimate gigs where the artist is all your focus and they are authentic, and mostly would have slower and intimate songs
8	anonymous	Because slower songs are typical of the genres I like. And faster tempos are typical of ones I listen less to.
9	anonymous	Id be more likely to head bang to a faster song
10	anonymous	There is a sense of honesty expressed from the slow tempo composition and a sense of vulnerability that connects with me on a human level.
11	anonymous	More likely to dance along

Bibliography:

Porcello, Niccolo. Vassar College Digital Window @ Vassar Affective Masculinities and Suburban Identities: Nu-Metal as Reflective Art. 25. Apr. 2016.

Volak, Vojitech. "Heaviness: A Key Concept of Metal Music Through the Lens of Deleuzian Philosophy." *Annales Universitatis Paedagogicae Cracoviensis: Studia de Cultura*, vol. 14, no. 3, 2022, pp. 53-62.

Smialek, Eric. "Genre and Expression in Extreme Metal Music, Ca. 1990-2015" 19 Apr. 2016.

Levitin, Daniel J., Grahn A. Jessica, London, Justin. "The Psychology of Music: Rhythm and Movement." *Annual Review of Psychology*, vol. 69, 2018, pp. 51-57.

Dalla Belle, Simone, Peretz, Isabelle, Rosseau, Luc & Gosselin, Nathalie. "A Developmental Study of the Affective Value of Tempo and Mode in Music". *Cognition*, vol. 80, no. 3, 2001, pp. B1-B10.

Yang, Zengyao, Su, Qirou, Xie, Jieren, Su, Hechong, Huang, Tiarnrun, Han, Chengcheng, Zhang, Sicong, Zhang, Kai & Xu, Guanghua. "Music Tempo Modulates Emotional States as Revealed through EEG Insights" *Frontiers in Neuroscience*

"How Music Helps Us To Run Faster." *Wings for Life World Run*, 11 Apr. 2023.

"Releasing Stress Through The Power of Music." *University of Nevada, Reno Counselling Services – Virtual Relaxation Room*, University of Nevada, Reno.

Herbst, Jan & Mynett, Mark. (2021). *Nail the Mix: Standardization in Mixing Metal Music?*. *Popular Music and Society*. 44. 1-22.