

**Does Vocal Discernability Affect Enjoyment of a Song Among Experimental
Hip-Hop Fans?**

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Abstract

Experimental hip-hop is a subgenre of hip-hop music which often incorporates musical elements that are unconventional to music typical of the genre as a whole. The focus on experimentation often also leads to a more creative approach to mixing which often goes against best mix practices which have been established by past music. The aim of this study was to examine different approaches to vocal mixing and find out which approach appeals most to fans of experimental hip-hop. Two tracks, Pegasus and Turbine, which already existed in a demo stage were recorded in collaboration with experimental hip-hop artist SVHymns, then three vocal mixes were made of each with each song. Different amounts of emphasis were placed on discernability of vocals and clarity of lyrics depending on the mix, from most to least. A blind listening test was then made and carried out on a group of fans of the genre, where they listened back to the mixes and answered questions on both the mixes and on the genre as a whole. The project provided a great insight into the mixing process as a whole and mixing preferences among experimental hip-hop fans and the factors which can affect these preferences. The majority of listeners preferred a less effects-heavy, discernible vocal mix on a densely arranged track (Pegasus), and a less discernible mix on a more sparsely arranged track (Turbine). Lyrics were also not found to be an important factor in its overall appeal on Pegasus but were on Turbine.

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Introduction

Mixing is the process of taking multiple tracks of recorded or synthesized audio to create a cohesive single final track for commercial release. This is done through balancing the individual elements by changing frequency and dynamic content, as well as panning. It is one of the final stages of creating a studio recording. There has been a lot of material previously published on mixing, much of which has been accepted as standard practice in the industry.

Generally, within a commercial music context, this prioritises maximum discernability of all the elements within the limitations of a stereo recording, but mixing is also concerned with transmitting a song's message and enhancing its emotions (Mendelson). Many artists go against best practice when mixing to better convey an emotional or artistic statement in their music. This project aims to examine those rules, as well as the validity of breaking them through a client-based approach, comparing a traditional mixing approach to a more creative one within the context of a specific genre, in this case experimental hip-hop. The overall goal of the project is to gain a better understanding of different mixing techniques and approaches to be able to apply them to future work.

Two musical pieces were recorded in collaboration with the client, recording artist SVHymns. Three mixes of each completed song going from least to most discernible were then created in the Digital Audio Workstation Ableton Live; These mixes drew upon past research in the field of audio processing for both 'industry standard' as well as more creative mixes. Only the vocals featured heavy processing, and the instrumental, which in the includes all musical elements except the vocals, acted as the control between mixes.

Each mix iteration focused on achieving a particular overall timbre within the vocals, serving to highlight a different aspect of the song, whether that be vocals themselves, the instrumental or both. A balance of mixes that have maximum discernability of elements as well ones as that use creative techniques were created to explore all possibilities within mixing.

Once the mixes were completed, a feedback stage took place. The completed mixes were subject to a blind listening test with several subjects which already had an interest in the style of music made by the client. The participants of the listening test were required to fill out a questionnaire regarding various subjective aspects of said mixes. The overall goal of the questionnaire was to

determine which mix works best for each song, as well as to gauge an overall reaction to the song and to see if it differs between mixes. The results, which gave an understanding of mixing preferences among experimental hip-hop fans, were analysed. Along with the client's feedback they were used to determine the mix of each song that is most appealing to fans of the genre and should be used for the release, with tweaks as needed. From the results of the questionnaire, it was found that mix preference depended on the song; participants preferred the first mix of the first track, Pegasus, while they preferred the second mix of the second track, Turbine.

Literature Review

The purpose of this review is to define the overarching research criteria through determining what makes a successful vocal mix within the limitations of a stereo recording in the genre of experimental hip-hop. The following review will analyse scientific research papers as well as more practical guides on mixing from industry professionals to give a balanced approach to the overall mixing process. Initially a groundwork will be laid for defining experimental hip-hop to provide context for the project. The more technical areas covered in the review will be established techniques for ideal discernability of elements within a mix, examples of creative mix techniques which stray from these rules and finally analysis of frameworks for evaluating mixes which will help when looking at mix references as well as inform the design of the listening test once the mixes have been completed.

Genre and Style

The current project deals with the broader subgenre of experimental hip-hop. According to online fan forum RateYourMusic, experimental hip hop can be defined as the following:

An umbrella term for Hip Hop music that pushes the constraints and boundaries of the genre by incorporating experimental and eccentric musical elements considered unconventional compared to the more traditional music of the genre. This can include unconventional song structures; odd rhythms; eclectic instrumentation; unorthodox sampling sources and methods; dissonant and atonal sounds; and incorporating other elements of genres not typically associated with hip hop.

More specifically the music of the client and the songs featured in the current project take influence from cloud rap. This is a subgenre of hip-hop blending hazy electronic production with a bigger emphasis on mood rather than lyricism (Fact), an approach antithetical to traditional hip-hop where lyrics are the main draw among fans. The style was pioneered in the early 2010s by artists such as Lil B and Clams Casino, whom the client has cited as an influence. More recently the style has been adopted by artists such as Yung Lean and Bladee, who have incorporated more electronic music influences (Tronosco).

Mixing Techniques and conventions

Case (xix) proposes that there are three major motivations in mixing music: the fix, the fit and the feature. The fix refers to dealing with problems that arise when recording. The fit refers to having all elements work together while minimizing masking, meaning all any instruments that can be heard should be heard. Avoiding masking allows for each instrument to fulfil its intended musical role in the context of the song. This is done through critical listening and signal processing on individual tracks or groups of tracks to achieve balance in frequency content. Finally, the feature refers to the more expressive part of mixing; highlighting individual tracks to convey the overall emotional or artistic intent of the track. A combination of the three motivations allows the mixing engineer to know what sort of signal processing to apply, as well as how much of it is needed. The approach is different depending on the material to be mixed, and a skilled engineer needs to make decisions that work best for the song. The three motivations were considered during all decision making throughout the course of the project. Case's book itself is not necessarily written to an academic standard but provides a useful approach to mixing.

Before mixing any vocals, an obvious first step to consider is the recording process. Houghton provides a comprehensive overview of everything needed when recording vocals. For a bright sound, which would suit the songs well and could be adjusted with EQ when needed, the author recommends using a large-diaphragm capacitor mic 6-7 inches from the vocalist and adjusting if needed. Recording closer to the microphone results in a drier recording free from natural room reverb, which is ideal for the current project as it allows for more control in the later part of mixing. Taking these steps allows the engineer to achieve a clear recording, allowing more time to focus on the fit and feature rather than fixing any mistakes.

The prominence of vocals is hugely important, especially in music where lyrics play a major role, a major focus for the current research. According to Hermes the importance of vocal clarity is widely agreed upon by industry professionals, though there are no proven objective factors that this depends on (191). From a previous study, the author suggests that clarity is determined by "the extent to which all the important components of a sound's natural timbre to be heard", however admits that this is not always the case and thus is not the main deciding factor. The author conducted a listening test comparing vocals with varying degrees of processing both isolated and in a mix. From the results of the test, vocals that have been EQ'd are generally received better in

all scenarios. In the mix, they were noted to have better presence separation from the rest of the instruments, and that they sounded more like other vocal mixes. This overall approach, with some tweaking, could be used for the current research. The article overall is more academic in tone in contrast to Case's book.

Knoll and Siedenburg take a similar approach; The authors aim to examine the idea of an 'optimal' mix with a focus on vocals and their relation to any instrumental accompaniment in the mix. The authors conducted a listening test on normal-hearing participants with excerpts of a song where the vocals have been volume adjusted in relation to instrumental accompaniment. The results showed that the stimuli with vocals 3-6db louder than the control were consistently rated higher among participants. This suggests that when given a choice, people will generally prefer vocals that are louder in volume than the instrumental accompaniment. The ratio between tonal and noise components in a vocal mix plays a factor in perceived clarity, therefore extensive usage of effects that affect timbre and add harmonic information should be carefully considered to achieve a balance of artistic expression and vocal clarity, and to avoid listening fatigue. These findings all point to vocal processing in favour of vocal discernability.

Anderton explores vocal editing and processing in detail, with a focus on fixing any issues that can arise while recording. There is a detailed discussion of vocal issues that can come up, such as de-essing, plosives, breaths, and pitch, which are all important to consider in the initial stage of editing and mixing vocals. It is essential to focus on the fix if any of these issues arise, as in even the most experimental mix unintended technical mistakes should be avoided.

Once edited to remove any errors, vocals should be low-cut to prevent low-frequency energy captured in the vocals from interfering with the same frequencies of other instruments, thus helping with the fix and fit of the vocals. (White) The author states that the low-end should be rolled back until any intrusive frequencies are gone. This article is written in an informal manner; however, a lot of information is provided on industry standard practices in mixing vocals.

Compression is important in not only in upping the overall level but also to increase the average vocal energy across a performance, which allows the vocal to remain prominent within a busy mix. Volume automation should be used for any glaring level jumps so that the compressor can be set to feature the vocal rather than working to fix it. White recommends a moderate ratio between 2:1 and 4:1 with an attack around 10ms and a release of 50-100ms as a starting point. Equalisation

should be used transparently, only removing problem frequencies and in certain cases making small additions. White advises using an EQ to find problem frequencies, typically in the 2-5Khz range, and using a multiband compressor to even these out. These techniques serve the fix but more so the fit within a song.

Shevlock (170) more specifically discusses mixing techniques and conventions in relation to modern hip-hop. There is a lot of information on vocals and their relation to other elements in the mix; while hip-hop is mostly spoken word, there are many different types of vocals often layered in a song which should be kept in mind when recording. The relationship between the vocals and snare is crucial, as they tend to compete in the same frequency range but are both important for the rhythm of the song. Consistency in volume is also cited as important for intelligibility in lead vocals, so compression must be carefully utilized. The importance of sub-bass prominence is also established, as hip-hop fans popularized subwoofers and thus bass is key in the culture of listening to the genre. As the author states: “In order for this best fit approach to work, the playback systems of music fans must be considered”, which calls back to Case’s principles.

The author also notes the non-linear nature of hip-hop mixing and production, with the lines between the two being blurred which is different from more traditional recorded instrument-based music. This has been kept in consideration throughout the course of instrumental production for the tracks, which required some editing or tweaking after vocal demos were recorded and a rough mix was made to fully mesh all the elements together.

Creative mixing

Throughout the history of music there are countless examples of songs which break conventions but are considered artistic successes due to their innovations. Many times, artists and producers use mixing techniques in an unintended way but end up with mixes that, while not adhering to standard mixing conventions, end up interesting in an artistic sense and in many cases are influential to the wider music industry, becoming commonplace stylistic choices. This leads to the idea of creative mixing and mixing as a performance itself, where the recording studio is considered as the instrument of the mix engineer who can imprint their own personal input into the timbre of a song (Anthony).

An early example of breaking mixing conventions is the production work of Joe Meek. His work is known for its use of heavy compression, tape echo, reverb, and distortion in the 50s when records

were meticulously recorded to sound as clean as possible. While Meek only had a relatively short career as a mixing and recording engineer, his approach to recording and mixing has since been applauded as being decades ahead of its time (Cleveland); several techniques he employed, such as using artificial reverb, close-micing instruments, and using distortion intentionally have become commonly accepted in the mixing world. He is also credited as one of the first producers to utilize heavy compression in a stylistic way rather than subtly using it in a corrective way. An example of Meek's sound is heard on The Tornado's *Telstar*, which despite eschewing recording conventions reached commercial success, reaching number one on the Billboard Top 100.

Auto-tune is a more modern example of a creative mixing technique. Initially the software was developed for subtle correction of off-key notes, but with more extreme settings it snaps vocals to a given scale faster than a person could feasibly do so, giving vocals a distinct timbre sometimes described as robotic or unnatural. Cher's 1998 track "Believe" produced by Mark Taylor and Brian Rawling is often credited with being the first to utilize the effect in such a prominent way, however it did not become a common feature in popular music until the late 2000s (Reynolds). T-Pain later gained popularity utilizing heavy auto-tune to create a retro-futuristic atmosphere in his music (Lee). Other hip-hop artists would utilize the same effect, including Kanye West, most prominently on his 2008 album *808s and Heartbreak*. The effect has since become commonplace in modern hip-hop and pop as an aesthetic choice rather than a method of pitch correction, with popular artists like Future and Travis Scott using autotune on many of their releases.

A more recent technique utilized within experimental hip-hop is to treat the vocals as more of an instrument, de-emphasizing the lyrics and putting the focus more on timbre, the opposite of what would typically be done in a hip-hop mix as mentioned earlier. One way in which this has been achieved is through effects on certain phrases within a line. Examples can be seen in Joeyy's *Gout*, where the lyrics in the chorus repeat ("you won't hear a sound"), but a tape stop effect is applied, cutting out the line before it finishes.

Mix Evaluation and Feedback

An important factor in the latter part of the research is gathering listener feedback on the completed mixes. To get useful feedback, the goal of each mix should be set; this will help in determining whether each mix is or is not successful in what it sets out to do. Deruty proposes the idea of goal-oriented mixing within the field of developing automated mixing systems. These systems typically

focus on what is ‘technically correct’ mixing, however the article goes on to investigate other approaches to mixing, along with mix examples for each. In the conclusion, the following possible mix goals are stated:

The mix may attempt to be transparent.

The mix may help create or convey a particular feeling.

The mix may follow trends (current or past).

The mix may help create abstract structures.

The mix may enhance and correct sounds.

The mix may prioritize tracks.

While the field of automatic mixing is only tangentially related to the current research, a similar overall method of categorizing mixes can be applied within the context of the current project, the mixes in which can fit into the categories described in the article. Thus, this can help inform whether each mix is successful in its intended goal. A practical way to set a benchmark for a mix within the current context is through referencing previous mixes in the given genre, a practice commonly used by mix engineers.

Deruty also links some of these goals to what are called BRECVEMA mechanisms. These are part of a framework for categorizing emotional responses to music (Juslin). These mechanisms are tied to different parts of the brain responding to different parts of the music, linking biologically evolved reactions used for human survival to different aspects of music. For example, the ‘brain stem reflex’ mechanism responds to sudden acoustic changes in the environment, while the ‘rhythmic entrainment’ mechanism is a response to periodic pulses in rhythms. The mix of a song is argued by the author to be an expression of an emotion in itself, tying emotion into the practice of mixing.

A criticism of the paper’s approach is that the selection of which mechanism applies to which type of mix seems to be based mostly on the author’s personal assessment. While the BRECVEMA framework may not be directly applicable to the assessment of mixes in the current context, it provides a useful set of guidelines to use as a base for designing a feedback questionnaire and determining mix goals.

In listening comparisons, the order in which excerpts are presented plays a role in determining results; stimuli presented first tend to yield higher preference ratings (Knoll and Siedenburg). Therefore, the order of questions and listening examples should be randomised to prevent biased questionnaire results.

Conclusion

The purpose of the literature review was to gain an understanding of commonly accepted mix techniques as a foundation for understanding the mixing process down the line. Past projects with similar approaches to the current research were analysed. In the current project these inform the design of the methodology in terms of mixing as well as listening survey design. Techniques that were once considered experimental but later became conventional were also explored to bridge the gap between the more technical and creative sides of mixing.

Methodology

The project aimed to compare different approaches to mixing an experimental hip-hop track. This was done through first creating several vocal mixes of tracks that employed different approaches. Each mix either emphasized or de-emphasized discernability within the vocals. This provided a practical way of applying previous research on mix techniques and conventions within a real-world scenario. The mixes were then evaluated through a blind listening test by fans of the genre. The purpose of this test was to get an understanding of whether a more creative mix with less discernible vocals and lyrics appeals to someone outside the creative process, avoiding the bias of solely the mix engineer and client evaluating the completed work. This approach for the project aimed to combine the practical mixing side with the data gathering and analysis to have a more well-rounded result.

Recording and Mixing

Two songs to be recorded were first selected based on client preference. These were existing demos, one where the instrumental was created in collaboration with the client (Pegasus) and the other (Turbine) created fully by the client. Contrast in vocal performances and overall elements between the two was considered during selection as to allow for more applications of different mix techniques; Pegasus features a more modern sung style of rapping, while Turbine features a spoken word style more traditional to hip-hop. As stated in the literature review, three mixes of the two songs were made - each mix focused on achieving a different overall timbre in the vocals. Overall mix timbres as well as individual elements were decided based on references chosen beforehand, and the mix goals suggested by Deruty were considered as well. The references were chosen based on artistic influence over the client, similarity of elements within the track as well as adherence to mix goals laid out for each mix.

Initially a pre-production stage took place, where working in collaboration with the client, vocal demos were recorded over the finished instrumentals. Mix suggestions and preferences from the client were implemented, giving a baseline to aim for in terms of timbre during the recording sessions and the proceeding mixing stage. Some important stylistic elements deemed non-negotiable were noted by the client, for example having the vocals autotuned on Pegasus to better blend them in as an instrument, having an 8th note delay on the main vocals for both tracks for rhythmic interest, or having some form of distortion on the vocals. While these mixing choices

were deemed important to the style and thus in some form featured in all of the mixes, the prominence of them and exact parameters could be changed from mix to mix, which still allowed room for creativity.

Vocals were re-recorded with the client in Sound Training Productions studio one for the first session and studio two for the second session according to best practices as outlined by Houghton. Recording was done in Pro Tools for compatibility with the setup as well as increased control over vocal editing. A discernible room reverb was avoided to allow for maximum control over the finished mixes. Previous research from the literature review on mixing techniques was used to inform these recording sessions and later mixes. As vocals are the main element in hip-hop, focus was placed on gaining an understanding of vocal mixing techniques such as those written about by Anderton and White. During recording, the various vocal parts outlined by Shevlock were considered based on the requirements for the song, though in the end only main vocals and background vocals were recorded due to an overall stylistic choice by the client.

Once recording was complete, the various takes were compiled into one performance, edited to remove any glaring mistakes, then exported. The finished mixes were completed in Ableton Live. In the context of mixing, Live has drawbacks compared to other industry standard DAWs i.e. Lack of true stereo tracks and limited return tracks. However, due to its flexibility in creative applications, for example ease of automation and easy chaining of effect racks, it has become the DAW of choice for many producers within electronic music (Bey). This makes it a good choice, particularly for more creative mix techniques.

In the context of this project, the control is the two instrumental tracks i.e. all the elements of the songs other than the vocals. The vocals act as the variable, being the only element that changes drastically between mixes. To adhere to best mix practices however, small adjustments in volume within individual instrument tracks have been made based on the volume of the vocals as well as their frequency content. This is to allow for a balanced mix regardless of the prominence of vocals, which more accurately reflects a real-world mixing scenario wherein instruments would need to be adjusted based on the vocals and how prominently they would feature in the final mix. Past mixing in the client's music came about as a stylistic choice but also partially as a way of compensating for poor recording equipment and conditions; Within the current project, the aim

was to take the ideas and style behind these mixing choices while refining them and finding a balance between a more typical and more creative approach.

Throughout the first stage of mixing, there was a focus on the fix and fit of tracks as outlined by Case. Once basic mixes of the track were complete, the feature was then considered, which is the main differentiating factor between the three mixes. As stated earlier, both tracks have a mix that prioritises vocals and overall discernability of vocals but will also have two mixes which place more emphasis on the backing track and utilise more unconventional mix techniques, utilizing more extensive automation and effects to create a unique timbre in the overall mix rather than simply aiming for discernability.

Feedback

For the second part of the project, a blind listening test of the completed mixes took place, and a questionnaire was created to be filled out by participants. The overall approach was like that of Knoll and Siedenburg, focusing on vocal processing and volume within a mix however with a lot more variables in terms of processing.

Participants were selected based on their interest in musical genres – Past research has suggested that preferred volume of elements can be based on whether the music itself is liked by the listener (Hoover and Cullari). Therefore, everyone who participated in the listening test already had an interest in the style of music presented in the tracks to prevent personal bias, allowing the focus to be on the actual timbre of the music. Participants were asked to evaluate each mix and to answer qualitative questions. Some of the following questions were asked:

- Which mix did they prefer and what features stood out?
- Would they listen to the music once released? Would this depend on which mix is chosen for the release?
- Did any lyrics stand out?
- What did they enjoy most about the track?

It should be noted that the listening test was carried out through an online survey with no standardisation of listening methods between the participants. The differences between listening setups however reflect the varied natural listening environments on which they would typically

listen to experimental hip-hop music, preventing any biases that may form from listening to music in an unfamiliar environment.

Suggestions however were made to prepare participants for the test. Participants were asked to use either external speakers or headphones rather than phone or laptop speakers for optimum audio quality. As part of the setup, they were also asked to confirm that sounds in the left and right channels could be heard separately to ensure that the mixes weren't being listened to in mono, preserving some level of clarity and preventing possible issues with phase cancellation¹ with stereo elements in the mix. A control song of the same genre adjusted to the same LUFS as the mixes was also included, which participants were asked to set to a comfortable listening level and leave it the same for the remainder of the test to prevent changes in volume affecting the results.

The overall results of the survey were be used to determine the best-fitting mix for each song, as well as to gain an understanding of average preferences among listeners. Once the feedback stage was completed, the mix to be released was selected by the client informed by the results of the survey as well as personal preference. It should be noted that the sample size is quite small due to the specific requirements needed i.e already enjoying a less-popular subgenre of hip-hop. This was accounted for in the contents of the questionnaire however, which has text fields for participants to input more detailed answers, allowing for more information to be collected from the small group of people participating.

¹ Phase cancellation is the result of sound waves working against each other. It happens when overlapping sounds contain related features that counteract when combined, resulting in a weaker overall sound. (Hahn) This can occur when a stereo recording is played back in mono.

Analysis

Recording

As mentioned earlier, the aim of the recording stage of the process was to provide a neutral recording to work with during the mixing stage. As recommended by Houghton, a large diaphragm condenser was used in both recordings. A Neumann U87 was used for the vocals for Pegasus, while an AKG C214 was used for Turbine. Baffles were also utilized on the first recording day where the live room of the studio was larger to deaden the recording space, again allowing for a more transparent sound. The setup for this can be seen in appendix A.

Mixing

Both first mixes focused on achieving a good fit and fit on the main vocals. The goal was to make the vocals the most featured part of the mix, allowing for maximum possible discernability amongst all the other elements, with a focus on making the actual lyrics intelligible. Referring to Deruty's mix goals, the aim of this mix was to enhance and correct sounds while also being transparent. Both mixes feature a very 'clean' sound within the vocals, with editing only being done to clean up any unintended mistakes and adjust volumes. The reference tracks used were the first half of Travis Scott's Way Back for Pegasus and Bladee's ICARUS 3STYLE for Turbine. Both songs feature vocals very prominently in the mix. The background vocals for Pegasus were treated more as a melodic instrument layer as per the client's request, featuring increasingly abstract processing from mix one to three.

The two further mixes were iterative, using the first mix as a base and adding further processing to achieve the desired timbre. The aim of the second mix was to be similar in timbre to the client's previous work but allow for more discernability in the vocals and more transparency overall, following genre trends to some extent while also being transparent. More prominent use of delay was implemented to match previous tracks from SVHymns, which filled out the vocals but also made them less discernible, though a compressor sidechained to the main vocal was used to keep some clarity. The references used were SVHymns' track misuse of the word for Pegasus, Yeat's track Turban for Turbine.

The third mixes are more extreme, focusing on creating abstract structures using the vocals rather than processing them as vocals traditionally would be. Keeping in mind Knoll and Siedenburg's findings, more prominent use of distortion was used which affected overall vocal clarity in the

lyrics. When the chorus repeats the plugin Shaperbox is used to stutter the vocals and cut off the line, similar to Joeyy's track Gout. SVHymns' Fairytales was used as the reference for Pegasus and is a strong example of focusing more on creating feeling using the vocals rather than aiming for discernability within lyrics. Ecco2k – Blue Eyes was used as the reference for Turbine. It should be noted that this mix strays quite far from the reference as it was difficult to find tracks which utilized the same creative techniques in the vocals but is used more as a reference for the overall levels and tonal balance of the individual mix tracks. Turbine features similar processing to the third mix of Pegasus, but also features delay throws with a very short time throughout, a mix idea conceived during a studio session with the client.

Mastering

After all the mixes were completed, they were then mastered according to best practice using Izotope Ozone. The processing during the mastering stage was kept as minimal and as similar between all the mixes as possible to avoid skewing the listening test results. The listening test deals only with the mixes, so having varying levels of processing between masters of the same tracks could affect listener perception of the mixes. All the mixes were mastered to a loudness of -12 LUFS² and a true peak of -1.1dB. Spotify recommends a LUFS of -14 as the service normalizes tracks to that level, though tracks are generally mastered to a louder level beforehand. For example, a more commercial track, like Travis Scott's Way Back is mastered to a LUFS of -8.2 with a true peak of 2.5dB, while a more experimental track like SVHymns' Fairytales is mastered to a LUFS of -6.3 with a true peak of 1.8dB.

Listening Test Results

A total of fifteen participants completed the listening test and questionnaire. Two of the participants however answered no to the question "do you consider yourself a fan of experimental hip-hop?" so the responses will not be used for analysis as they do not fit the target demographic. Of the valid thirteen participants, all but two either made their own music or had some form of musical education, indicating that most participants had some familiarity with the technical aspects behind the music. Eight of the participants said that when they listen to experimental hip-hop, they

² Loudness Units Full Scale, a standardized way of measuring audio that blends the perceived loudness from human hearing and the true intensity of an audio signal together. It is used by industry professionals to set average loudness standards across media. (Emastered)

pay more attention to the beat or production rather than lyrics, with three others prioritising lyrics and the remaining two prioritising vocal flows and melodies rather than lyrics.

Overall, the most preferred mix for Pegasus was mix 1, with seven participants having chosen it, followed by five participants for mix 2. Only one participant chose mix 3 as the best. This demonstrates that in the case of this song, a less effects-heavy approach is preferred by the majority. The participants that chose mix 1 recognised the attempt at clarity in the vocals and enjoyed that element of it, while the participants that chose mix 2 felt that it was a more balanced and a good middle ground between the two other mixes.

The response to Turbine was more mixed, with five participants choosing mix 2, three choosing mix 1 and three choosing mix 3. One participant did not have a preferred mix. Similarly, the participants that chose mix 1 recognised the vocals to be clearer and found the lyrics more understandable. The participants who chose mix 3 found it fuller sounding and heard the vocals as “intertwined with the synths”. The way the results are divided can be seen on the charts below (fig. 1 and 2).

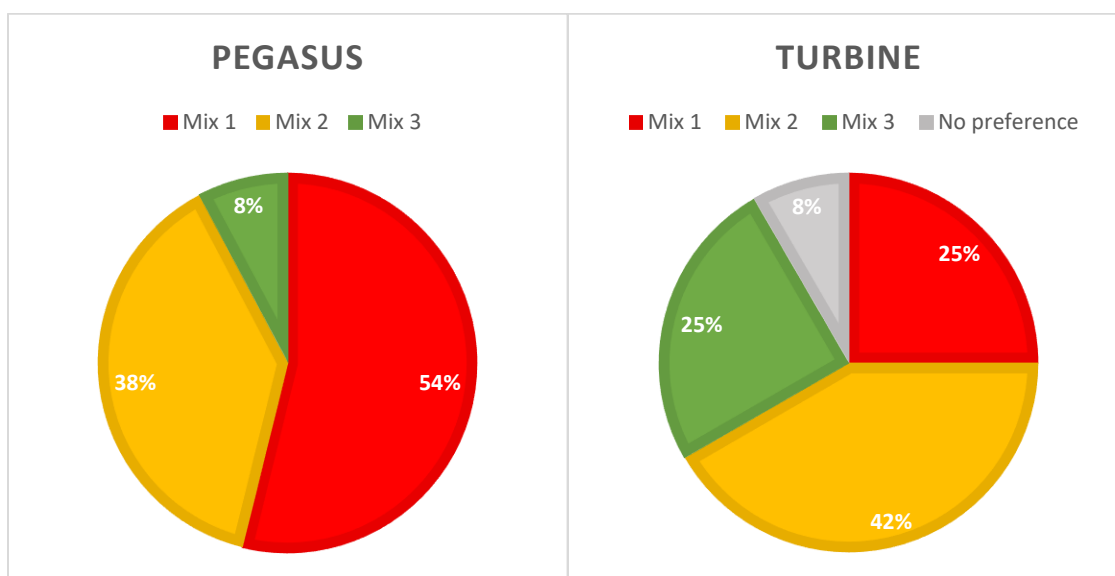


Fig. 1

Fig. 2

The mix of the track has also shown to play a role in whether participants would listen to the track once released; for Pegasus, seven participants would only listen to their preferred mix of the track, while five participants would listen to any mix, and the remaining one would not want to listen to

any mix. For Turbine, five participants said they would only listen to their chosen mix, while the remaining eight would listen to any mix.

When asked about elements they enjoyed about Pegasus, all thirteen participants mentioned an element of the production, particularly the drums and bass. Three participants enjoyed the balance of vocals and the instrumental. When asked if lyrics played a big part in the enjoyment of the song, twelve participants said no, while one participant said that in their preferred mix the discernability of the lyrics added to their enjoyment of the song. This was reflected when participants were asked to recall any memorable lyrics without listening back; five participants could not recall any lyrics, seven recalled the same repeated part of the hook, (“Cash flow..”), and one other participant recalled the term “baffled”.

When asked the same questions about Turbine, six participants cited the vocals as being the most appealing element, with two of them mentioning the lyrics. Two participants cited the blend of the vocals and instrumental, though both had chosen different mixes as their favourite. The remaining participants mentioned elements of the instrumental, particularly the lead and background synths. Six participants felt that lyrics played a big part in the appeal of the track, six felt that they did not, and one answer was ambiguous. Seven participants could recall lyrics however they were all mostly different which would be due to the lack of repetition in the snippet during the listening test. As an additional question, participants were asked if having lyrics available affects their enjoyment when listening to music, to which eight participants replied with yes, while the remaining five claimed it makes no difference to them.

Discussion

Recording

Ideally the same microphone would have been used for both days for consistency, but the microphone was unavailable on the second recording day as a different studio had to be used due to a last-minute scheduling issue. Using different microphones however did allow for more variation in sound and different processing between the two recordings, as the Neuman had a different tone particularly in the high end. The client was also not available for the entire duration of the allotted studio time, which gave less time for takes. Despite these hiccups, the recordings were successful, as the performances were captured as required.

Mixing and Mastering

During the mixings stage of the project, emphasizing and de-emphasizing vocal discernability through the mixes was a key focus. Within the context of the current project, discernability refers to the listener's ability to hear a vocal and be able to understand the lyrics. The level of discernability is affected by both vocal volume in relation to instrumental elements, but also dynamic effects which change frequency content and time-based effects such as delays which 'smear' the vocal.

Within more of a technical mixing context, this would refer to masking of elements within the mix. Generally, the goal of a mix is to prevent masking to allow for a transparent mix however this approach is not always applied, i.e in mixes 2 and 3. A spectral diagram created in Melda MMultiAnalser can be seen below, comparing the timbre of mix 1 of Pegasus to mix 3. The spectral diagrams for the other mixes can be found in appendix B. "Synths" in this case refers to all synth layers that are not part of the lead, focusing more on harmony.

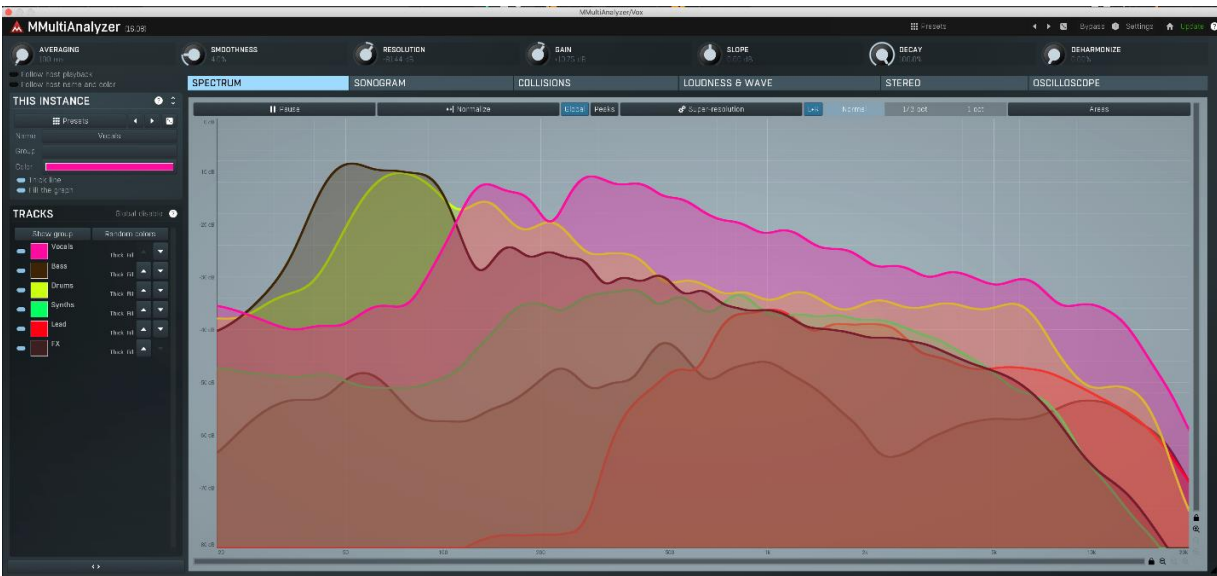


Fig. 3: Pegasus mix 1



Fig. 4: Pegasus Mix 3

Overall, the mixing aspect of the project was a success in both applying skills in different approaches while also experimenting and finding the best approach for each song. While there was pressure due to the timeline of the project, the mixes were still completed to a satisfactory standard while sticking to the plan made. More feedback from the artist could have been used to further improve upon the mixes, however due to time constraints and scheduling differences this was difficult to incorporate. The artist was still updated throughout the process and signed off on the final mixes, having preferred mix 2 for Pegasus and mix 3 for Turbine with some small tweaks.

The approach to mixing which combined research followed by practice allowed for more deliberate decision making and for an immediate application of the skills learned through the research. The mix goals set out for each mix of both tracks were also met, as generally in the listening test participants were able to discern that mix 1 was clean sounding while mix 3 was the most abstract.

During the mastering stage, there was no need to bring the masters of the songs to the levels of the references, as the mixes for the project were not played in succession with these existing tracks. There was also no access to a purpose-built room with monitoring equipment and treatment throughout the project, which would make an industry standard master difficult. Mastering to -12LUFS allowed for standardisation of volume across all the mixes while keeping the masters relatively transparent and also preventing clipping³. The overall aim of the mastering stage was to prevent listener bias due to volume differences between the tracks which could occur due to the introduction of new frequencies because of the processing done.

Survey Results

Most of the results of the survey were as expected with listening trends among hip-hop fans in general. Most participants preferred either mix 1 or 2 of the tracks, which had more discernible lyrics, showing that discernability does affect enjoyment of a track, although for Pegasus this was more of a factor than expected. The third mix of each track was intentionally processed in an exaggerated way, taking a more experimental approach to mixing which goes against typical mix practice. Most of the participants were able to pick up these differences likely due to them already having had musical experience. The client himself preferred mix 2 for Pegasus and mix 3 for Turbine with some tweaks namely in making the vocal more prominent, showing that the client's mix preferences match up with the expectations of fans of experimental hip-hop. The mix itself plays a factor in whether fans would listen to a song, though this played less of a role than expected; seven participants answered yes when asked if they would only listen to their mix of Pegasus, while five participants did the same for Turbine. Five of these participants answered yes for both tracks, perhaps indicating that they are more discerning of detail in a technical sense, while the others based their choice more on preference for the song itself.

³ Audio clipping occurs when the signal is at a level too high for the system, in this case a Digital Audio Workstation, causing unwanted distortion. (Brunotts)

In terms of the songs themselves, it is likely that the arrangement and production of the tracks played a large role in these results; Pegasus has more elements within its arrangement than Turbine and has more of an emphasis on production rather than lyrics as backed up by the survey results. The second and third mixes of the tracks feature less discernible lyrics, but the vocals themselves take up more space in the mix due to the effects used, masking elements in the instrumental. As stated earlier, more masking occurs within different elements of the track. Therefore, it makes sense for listeners to prefer the first mix of Pegasus as even though the lyrics are not as important, it allows the listener to hear more of the instrumental. Similarly for Turbine, the mix is less dense in terms of arrangement and thus despite the bigger focus on lyrics the less discernible vocal mixes still allow for the lyrics to be understood. The following are screenshots of the Ableton sessions for the instrumentals of the two tracks (Figs 5 and 6), demonstrating the contrast between the two in terms of elements and arrangement:

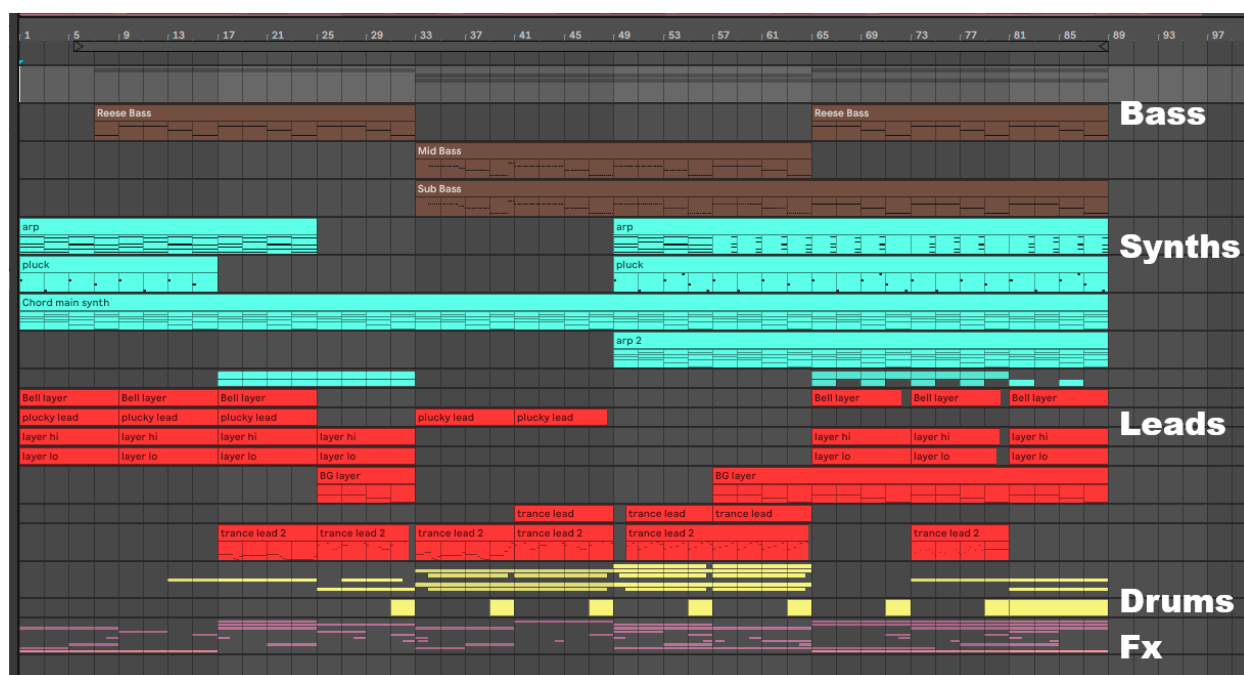


Fig. 5

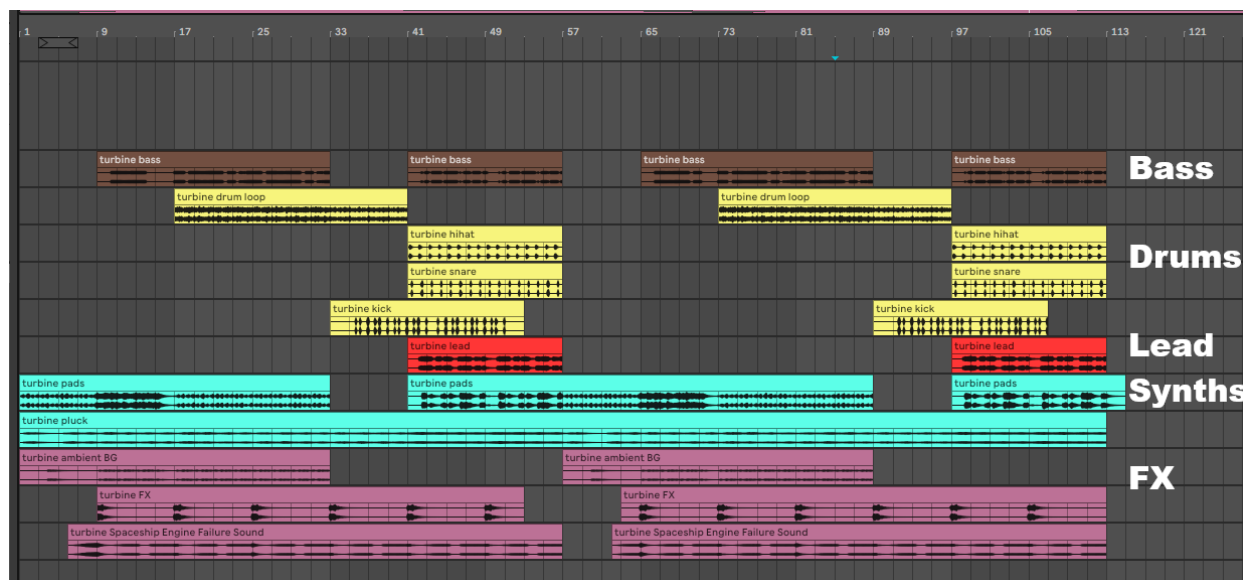


Fig. 6

In terms of lyrics, Pegasus had more memorable lines as it had a repeating hook, which Turbine did not have. Turbine has the entire verse repeat unchanged in the full song however for the sake of keeping the survey at a reasonable length only one half of the track was played, which may have skewed results somewhat. According to Nunes et al having repetitive lyrics results in better processing fluency thus leading to better understanding and memorability, which was demonstrated in the survey results. It should be noted that in the listening test, the presentation order was reversed i.e from least discernible to most. This was to allow listeners to pick up more of the lyrics as the test went on rather than hearing everything on their first listen of the song.

The excerpts in the listening test were not randomised as this was not possible with Microsoft Forms, the surveying software used, which may have led to some bias. However unlike in Knoll and Siedenbug's study, the excerpt presented first was in fact the least preferred amongst participants, showing that in the case of the current project the differences between the excerpts presented may be different enough that presentation order does not make a large difference in the results.

Despite some small issues regarding scheduling, the overall project plan was followed closely with enough time left for changes when needed. While the overall scale of the project was small, the design of the project was fit for purpose and successfully answered the research question while also fulfilling the more practical project aims and learning goals established earlier. Ideally, more time would have been allocated for the mixing stage though despite tight timelines the mixes were

finished on time according to the plan set out and to a satisfactory standard. The feedback stage was completed in one week rather than two as initially planned, which allowed more time for writing as well as contingency.

Conclusion

The approach to the project worked in providing insight into the vocal mixing preferences of experimental hip-hop fans with some caveats. From the results of the study, it can be concluded that discernability of vocals does play a role in the enjoyment of music among experimental hip-hop fans, though this depends on the elements in the song itself. Participants preferred a more discernible vocal mix on a track that focused more on the instrumental, as elements within the instrumental were masked less. A slightly less discernible vocal mix was preferred on a track with a sparser arrangement which led to less masking. The mix chosen has an affect on whether participants would listen to a track, though this may have been due to most of the participants having technical knowledge of music. Eight of the participants said they consider the beat or production more important than vocal flows or lyrics. The importance of lyrics to the enjoyment of music again varied based on the song, with almost all participants claiming lyrics were not important for the first track, while just under half claimed they were important for the second song.

Limitations

The project is small in scale due to time and resource limitations. While the results are valid for the two tracks chosen, they are not conclusive for the genre as a whole due to the small sample size of participants and tracks tested. As shown in the results, the arrangement of the tracks chosen has played a role in determining the results. Ideally, there would be a wider variety of tracks shown to participants which would have more variation in complexity and number of elements.

The recording process in the current project intentionally prioritised having clear recordings without any unique timbres to give more prominence to the differences in the mixing. Using different recording hardware i.e microphones and preamps as well as micing techniques and distances could have given different results to the ones seen in the survey, though this was not explored due to time constraints.

Further Research

An area for further study that was touched on in the questionnaire is the importance of lyrics within a song. In recent years artists have uploaded their music with an accompanying lyric video, or have had lyrics included in music videos, including the client in the current project such as in the video for the track 'walk away'. Services such as Spotify in have implemented lyrics displayed on screen while the music plays, which shows there is demand among music fans to have the lyrics of a song

available. Future research could analyse how having written lyrics affects enjoyment and how big of a factor this is among different genres.

The performance in a hip-hop song greatly affects discernability, particularly in the last decade where style has played a bigger role over lyrics and artists intentionally slur words to evoke a particular timbre. A prominent example is in the discography of Young Thug, particularly on a track like Digits. The current project does not examine the impact of this on the listener, having had only one main vocal track recorded per song to isolate the impact of mixing in isolation. Future research could adapt a similar approach but with different vocal performances.

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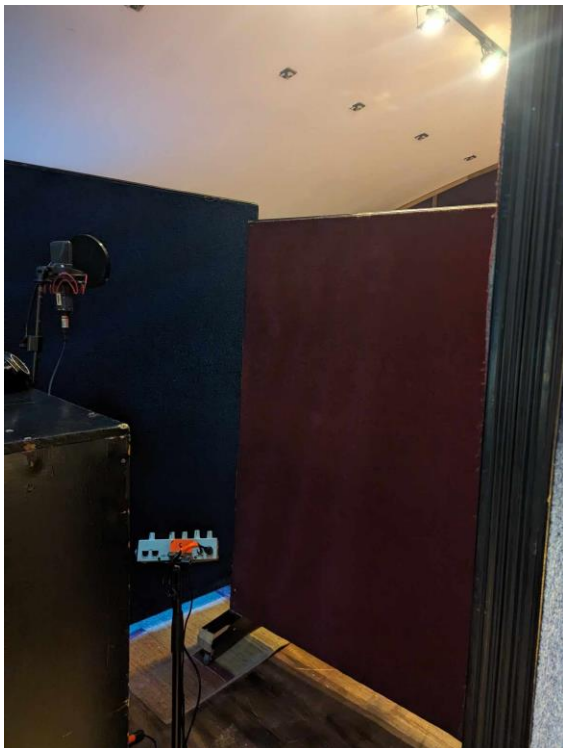
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Appendix

Appendix A: Recording setup in Studio 1.



Appendix B: MMultiAnalyzer spectrum diagrams for completed mixes. These readings were taken during the busiest section of each track.

Pegasus Mix 2 MMultiAnalyzer Reading



Turbine Mix 1 MMultiAnalyzer Reading



Turbine Mix 2 MMultiAnalyzer Reading



Turbine Mix 3 MMultiAnalyzer Reading

