Nail the Mix: Standardization in Mixing Metal Music?

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ABSTRACT

This article explores how the proliferation of affordable digital tools and the availability of specialist knowledge have affected the mixing stage of metal music productions, asking whether a standard methodology is apparent in producers' use of templates and presets, processing of audio, and choice of tools. Analyzing fifty professional metal mixes on the platform Nail The Mix, the findings suggest that although producers follow a vaguely defined standard methodology for technical reasons, they have leeway for individuality and creativity. Producers freely give insight into their mixing approaches, which likely inspires exploration of new approaches in the metal producer community.

KEYWORDS

metal music; mixing; Nail The Mix; record production; standardization

Introduction

This article aims to investigate whether a standard mixing methodology in metal music exists. In light of decreasing recording budgets and required audio processing aesthetics, the mix-phase focus is due to the determination that this is the stage where metal’s sound is increasingly determined (Thomas 221). The data employed were collected from Nail The Mix (NTM), a platform offering monthly live streams of professional metal producers mixing a previously released song in real-time, accompanied by questions from the host and online audience. NTM is not just a database of videos but a subscription-based community with in-person “summits” and a closed Facebook group of 5,000 producers, including many successful producers in the genre. This rich data source enables examining and comparing the relevant producers’ mixing approaches from start to finish. The overarching research objective is to determine whether a standard mixing methodology can be observed, as indicated by templates/presets and the tools used, as well as the audio processing tactics and general mix ethos employed. The study does not aim to define the sound of metal, nor establish the standard method when mixing metal music. Instead, it sets out to analyze the extent to which standardization is evident, where there are differences, and which ones are systematic.

International networks, digitalization, and global connectivity have considerably impacted how popular music is produced. The proliferation of affordable and powerful
digital tools, aka the democratization of music production (Leyshon; Strachan; Théberge, “Network”), allows artists to produce music themselves or become more involved when collaborating with audio professionals (Fitterman Radbill). Digital production also lowered the financial barriers for professionals and led to a shift in the recording industry from large studio complexes operated by major record labels to smaller, independent, and often specialized enterprises run by individuals or small teams (Leyshon; Théberge, “The End”). Apart from the technological resources needed to produce music, the knowledge to use them is essential. Historically, such knowledge was exclusive. As a trade secret of audio professionals, tacit knowledge was only passed on to carefully selected individuals like their assistant engineers (see Schmidt-Horning). Gradually, this practice of selective sharing has also been democratized.

An alternative to the traditional assistantship is formal music technology courses, which are generally vocationally oriented (Davis et al.) and teach aspiring professionals the necessary skills (Boehm et al.). With the Internet, a rich knowledge base has become available to anyone with access, providing guidance for beginners and inspiration for established producers. Video platforms contain tutorials on all aspects, from pre-production to recording and final mastering. Such specialist knowledge is complemented by text-based online tutorials, magazines such as Sound on Sound or Music Tech, and book-length manuals on audio producing in general (Savage; Winer) and for specific genres (Mynett, Metal; Snoman), as well as for recording (Huber and Runstein; Rumsey and McCormick), mixing (Izaki; Senior), and mastering (Katz; Owsinski). Moreover, numerous virtual communities of practice (Wenger) exist in online message boards or social media groups, where laypersons and professionals share their knowledge. There is a growing market of free vlogs by professionals such as Pensado’s Place of mixing engineer Dave Pensado, besides commercial instructional videos provided by, for example, Produce Like a Pro, Mix with the Masters, or Nail The Mix, which offer alternatives to traditional studio assistantships. On a software level, digital audio workstations (DAWs) contain presets that give users access to professional, albeit generic, sounds categorized by sonic effect or genre (Strachan 26–27). These presets are supplemented by virtual amplifier and microphone simulations with predefined algorithms or impulse responses and genre-specific drum libraries.

For all the benefits that the democratization of resources and knowledge has for breaking down hierarchies of power and enabling inclusivity and diversity, one might wonder how the musical product is impacted. Zagorski-Thomas finds that the once distinct aesthetics of British and US-American popular music productions had become almost indistinguishable by the end of the 1970s, consistent with Massey’s assessment. Up to the mid-1970s, productions in the two countries varied due to differences in recording equipment, training of audio professionals, and aesthetic ideals. After that, a standard emerged in terms of engineering practice and equipment.

Metal music research has documented the impact of technological development on production aesthetics. Williams tracked the timbral changes from 1990 to the early 2010s and empirically demonstrated how digital technology enabled metal producers to achieve ever-increasing levels of heaviness (Berger and Fales). Mynett (Metal, “Defining,” “Heaviness,” “Maximum”) explored ways to produce metal music based on his experience as a producer and interviews with other professionals. Thomas also interviewed metal producers but captured their attitudes and perceptions from a phenomenological
perspective rather than their typical production approach. Building on the research of Zagorski-Thomas and Massey, Herbst examined national and cultural differences to metal music production with a historical comparison of US, British, and German approaches based on interviews with producers ("Formation," "Views"), analysis of metal media ("From Bach"), and practice-led research ("Sonic"). The findings concur with Zagorski-Thomas and Massey that recognizable culturally specific production aesthetics have gradually declined.

Assuming there is a tendency for metal to sound increasingly homogenized, the question arises: why is this the case? Technology is a likely contributor, but its application depends on the people using it, who bring individuality, creativity, values, and aesthetic taste into the equation. Based on interviews with seven metal producers from different generations, Thomas and King conclude that a standard production methodology has formed, underpinned by an accepted value system and expected sound aesthetic. The interviewed producers disapproved of the pressure to adhere to conventions but admitted to conforming to expectations out of economic necessity. If such a production methodology exists, it is not explicitly documented, but the producer experiences captured in Thomas and King’s study are consistent with those in Mynett’s *Metal Music Manual*, which comes closest to a formal manifestation of such a methodology.

Following a description of the method employed in this study, the analysis focuses on two areas: 1) the producers and their attitudes to mixing, and 2) the mixing process. First, the socio-demographic variables of the producers studied and their role in the record productions analyzed are discussed. The predominantly white, male, and western sample suggests a degree of standardization, at least for mainstream metal production in the global north. The finding that most of the producers who mixed the tracks also recorded and mastered could either lead to an aesthetic conforming to conventions or a deviation due to the professional’s distinct sonic signature. Different opinions are observed regarding the use of templates or presets. While some producers view comprehensive mixing templates as time-savers since they complete routine tasks, others consider them unethical because they do not support the artists’ individuality. In contrast, presets for individual processing tools are generally rejected because the mix must respond to the specific acoustic properties of the material. The analysis of the mixing process is divided into contextual observations, the main instruments of drums, guitars, and bass, and the tools used to gain a qualitative understanding of the degree of variability between producers and projects. It is complemented by statistical analysis to determine systematic correlation and variance between person- or project-specific variables. The findings indicate that while producers try to find individualized mixing approaches for each artist to create personalized sounds and avoid repetition, the process follows a certain logic. However, in contrast to the pressures of convention proposed by Thomas and King, acoustic laws ultimately limit the degree of freedom. Successful commercial metal production must achieve a balance between sonic attributes (see Mynett, “Maximum”). As Mynett argues,

A majority of listeners want this style of music to present a dense and powerful yet clear sound. The artists usually want the same, as this translates and enhances the best aspects of their performances. These qualities are afforded through an effective balance between
heaviness, sonic weight, clarity, and performance precision, with each having the potential to inform the other. Different productions need these characteristics emphasized in different ways; however, a production that is deficient in all four is inevitably weak. (Mynett, Metal 21)

These technical, aesthetic, and commercial requirements potentially limit creative freedom in mixing, a production stage that significantly shapes the aesthetics and quality of the final record. Yet, despite the existence of a relatively standard mixing approach resulting from the above constraints, the most accomplished and successful are producers who find individual solutions to acoustic challenges to distinguish themselves and their artists (see also Herbst and Mynett).

The present study contributes to the growing academic understanding of metal music by adding detail to its production processes. While Thomas and King and Herbst and Mynett offer analyses of perceived standardization based on producer interviews, this research closely examines the actual mixing process documented in videos and the degree of commonality and individuality between producers and projects, detailing the standard mixing approach and possible deviations. Consequently, specific mixing methodologies are examined rather than general statements, and unlike Turner’s analysis of metal producer Andy Sneap’s mixing approach based on one song, this study compares 50 songs mixed by 37 professionals. This research thus addresses Thomas’s criticism of Turner’s study that it lacks a comparison between the production methods of different producers (259). It also extends the large body of cultural studies inspired research in metal music exploring the complex relationship between a genre defined by conventions and the fans’ attempt to find individuality in their fandom (e.g. Cardwell; Hoad; Kahn-Harris; Spracklen, Metal).

**Method**

The method may be described as virtual studio ethnography, following other online ethnographies in metal music research such as that of Spracklen (“Opeth”). Unlike Bates and Meintjes, who documented the music production processes of Turkish folk music and South African popular music respectively by being in the studios in a traditional ethnographic manner, we were virtual flies on the studio walls (Davis). Screen capture of the mixing process supported by producer explanations allowed in-depth analysis. NTM tutorials follow the same structure; they begin with general information about the album production and cover mixing preparation, followed by live mixing of the track. After the live stream, the unedited videos remain available with all breaks and technical interruptions. The sample comprises 50 videos with 37 different producers released between November 2015 and January 2021, with a total runtime of 371 hours. The videos, producers, and songs mixed are listed in the data section. In terms of genre, NTM distinguishes between metal (28%), extreme metal (28%), and metalcore (44%). We adopted this classification because the subgenres differ musically and ideologically (Kennedy; Smialek). The extreme metal videos do not include black metal due to its prevalent production aesthetic, which is different from most mainstream metal genres (Reyes).

Concerning the sample, certain limitations must be noted. As detailed further below, due to the homogeneous group of producers featured on NTM, the sample is biased in
favor of middle-aged white men located in predominantly western contexts. These producers represent the mainstream of commercial metal production in the global north, whose lack of diversity the provider consciously or unconsciously reproduces and reinforces. Apart from these ethical considerations, this specific sample limits the scope of the findings to mainstream metal production in the northern hemisphere. Future research may study metal production outside the dominant western sphere, which would allow for an analysis of the often-claimed global nature of metal music regarding music production (Wallach, Berger, and Greene).

The study employed an empirical mixed-methods design (Cresswell 208–27). Primary qualitative data from the observed mixing were complemented with quantitative parameters that captured whether producers adhered to particular approaches or used specific tools. The process of data collection and analysis was inductive. We began watching the videos without predefined categories, taking notes on the mixing process. After 60%, we created a category system, concentrating on the observed activities that promised commonalities or variance. When studying the remaining videos, we filled in the category system and refined it. The final system consists of quotes and observations, providing insights into the producers’ thought processes, and operationalizable parameters. Using parameters allowed for integrating a quantitative component into the study, which seemed useful to investigate the existence of a standard mixing methodology.

The Producers and Their Attitudes to Mixing

For analyzing standardization in metal music production, it is pertinent to reflect on the sample of producers and discuss related personal factors. Such a discussion must consider attitudes toward signature sounds, mix templates, and presets, and, apart from socio-demographic factors, professional roles in music production.

The Producers

All 37 producers, 33 of whom work alone and two in teams, are white and male. The geographical representation is as follows: 49% US, 16% UK, 13% Sweden, 5% Denmark and Canada, 3% Australia, Germany, Italy, and Ukraine. The average experience of 18.1 years (SD = 6.8), measured by the first technical credit on discogs.com since not all birth dates are available, suggests that the professionals are middle-aged. While this sample, male, white, middle-aged, and western, might be due to an unconscious bias, it is in line with research emphasizing gender inequality in metal music production (Berkers and Schaap) and lacking inclusivity in music production in general (Smith et al.). Absent diversity among those producing professional metal releases and sharing their knowledge on educational platforms like NTM potentially contributes to standardization.

Another potentially relevant variable is the personnel involved in music production, which was historically divided between the technical roles of recording, mixing, and mastering engineers and the creative and managerial producer (Burgess, Art; Zak). The different roles were partly due to specialist skillsets and higher budgets in the recording industry that afforded specialization (Leyshon; Théberge, “Network”). Previous research has suggested that in metal music, an enduringly popular genre, but also one that is
experiencing significantly reduced production budgets, the producer usually assumes all roles except mastering engineer (Thomas). The analyzed sample provides empirical evidence; 82% of the professionals who mixed the tracks were also their producers. Besides, 76% recorded and 66% mastered the albums. As the producer statements indicate, the reasons for merging roles might be of creative or financial nature or a facilitated workflow, apart from being more lucrative for the professional. While it is unclear whether they are being paid a flat fee, as is common in popular music, producer credits would increase their chances of receiving royalty payments (Burgess, “Producer”; Herbst & Albrecht).

Concerning standardization, the finding that most of a record’s sonics are shaped by one person, the producer, can be interpreted differently. If the producer has a unique sonic signature, the result may differ from most commercially successful modern metal music productions. However, having a signature may not be compatible with the implicit conventions said to exist in metal music (Thomas and King). Some established metal producers have rejected a signature sound, including Bob Rock (Brown, “Rock”), Terry Date (Brown, “Date”), Martin Birch (Brown, Iron Maiden), Rick Rubin (Ferris), and Kevin Shirley (Brown, Iron Maiden). As Bob Rock once stated:

I hope there isn’t a signature Bob Rock sound, because I’ve worked many years so that it doesn’t happen. I like making records, and I like making records that interest me, and there’s not supposed to be any formula in that. To be quite honest, I’m not into being a career record producer. It’s not about my career. There was a time in my life where it was, but since [Metallica’s] The Black Album I’ve tried to be a better producer, as well as work with bands I find interesting and challenging at any given moment, and help them realize what they want to do. It’s not a Bob Rock record; it’s never been about me. (qtd. in Brown, “Rock” 63)

However, the lack of a signature sound cannot be equated with homogenization, as a relevant band’s artistic vision might be the guiding factor in an original production aesthetic. What can similarly be considered ambiguous is professional collaborations. From one perspective, it may dilute an individual engineer’s or producer’s signature sound and lead to a homogenized result, but due to the distinct skillsets and tastes (see also Zak 168), it is also possible that different signatures contribute to a unique sound. As Thompson shows, record production benefits from collaboration because it promotes creativity (see also Zak 63).

In the analyzed videos, discussion often touches on sonic signatures and individuality. Although one might imagine a platform like NTM leads to standardization through knowledge exchange, it intends the contrary, stimulating individuality. Eyal Levi describes it:

Because of this time period [around 2010] . . . I started NTM because I felt rock and metal production were going into a weird direction, a bad direction. And all the great things I thought were valuable, I felt they were getting lost, and everything was starting to sound the same, and that was by choice. People wanted stuff to sound the same. One of the reasons I started was that I was to try to fight that. I definitely believe the ethos from the ’90s to fight to have their unique sound is super important. I think now it’s a thing again. But 2010, scary times. (Levi in Morabito)

For Levi, 1990s metal bands such as Pantera or Sepultura were instantly recognizable, unlike many bands around 2010, partly due to a uniform production aesthetic. Contrary
to Thomas and King’s finding that producers must adhere to the norm for economic reasons, some of the analyzed producers like Tyler Smyth emphasize that having a unique sound is beneficial for their career.

Definitely impart your flavor. . . . This was one of the first big records that I produced and mixed, so I was very interested in developing a sound. You hear some of these producers and just recognize their sound right away. Joey [Sturgis] is one of these; it’s an unmistakable punch and clarity that you associate with Joey. As producers, but especially as mixers, you really want that because if your sound is popular, and you’re good at it, and it is a sound people desire, you’ll gonna get a lot of business, you’re gonna leave a mark on rock music; something that is very appealing to me. (Smyth)

Producers like Tyler Smyth highlight that serving the client and being unique are not incompatible. A producer may best serve a client by helping them sound original, a sentiment shared by Max Morton. Furthermore, Joey Sturgis (“Conquer Divide”) states that he strives to “beat any mix I had ever made before and to have a punchier, heavier, more epic mix than anyone else at the time.” Such progress and advantage over others cannot be achieved by following the norm; it requires transgression (Kahn-Harris). There are others, though, especially older producers, not imposing a signature on a band. Russ Russell (“At the Gates”) is keen to avoid a signature sound and therefore does not have a fixed mixing system. Likewise, Fredrik Nordström (“Bring Me”) elucidates: “I realized, the job as the producer is not to bring your sound to the band, it is to bring the band’s sound forward. What can you do to make this sound better? Not what can I bring to the band.” These different views show disagreement about whether a producer’s signature sound is an asset or a disadvantage.

**Templates and Presets**

Templates and presets potentially induce standardization in mixing. Templates can take different forms, from routing audio signals to complete processing chains for instruments and instrument groups. Only 27% of the producers use templates with predefined processing chains; all others either take routing setups or start entirely from scratch. A strict mix routine bores Fredrik Nordström (“Bring Me”) and Henrik Udd, and Carl Bown considers templates unethical as a disservice to his clients but admits that time and budget constraints do not always allow him to start from zero. Eyal Levi (“Chelsea Grin”) refers to a “workflow template” and emphasizes that no plug-ins or settings are included, supporting the impression that some find templates unethical. Others like Jacob Hansen are less dogmatic and see templates merely as time-savers:

It’s not like I’ve got a template I can import into. I import the tracks only and start working on that. And then I have templates for some busses I can import and try out how that works and start from there. So, I usually have a few options to go through. What kind of bass drum, what kind of music am I working on, how’s the kick drum gonna sound? And I have some different templates for that because I have realized that starting totally from scratch all the time, I would anyway use many of the same busses, ideas, and routing. So, I’m actually working on still refining templates and remembering from time to time to save something when I think this was good; it may be handy later . . . It’s good to be pretty fast in the beginning. . . . You have to be in the right headspace. I love the hours before noon because
that’s where I will get the majority of the mix going. So, things need to be fast for me. (Hansen, “Dyscarnate”)

Even though Jacob Hansen is less critical of templates, he legitimizes them for creative reasons.

The specific nature of relevant mix templates is important in this context. The most significant aspect of the “routine tasks” aspect is the “import data” approach for implementing mix groups and effects paths. This approach can purely be considered as introducing preferred plug-in models for mix group compression and time-domain effects roles (reverb, delay, modulation effects). All settings, be it for equalization, dynamics, or effects processing, still must be adjusted to the musical material at hand and its recorded audio properties.

George Lever has an ambiguous relationship with templates. While they potentially prevent him from developing, he agrees with Hansen that “there are certain combinations of things I like, I’m always going to go towards them. Then it makes sense to have them on hand.” Among the producers unreservedly using templates are Taylor Larson (“Jason Richardson”) and Jens Bogren (“Between”), who employ them to start the mix. Bogren emphasizes that the templates require regular updates to reflect his development. He also customizes the template for each album to ensure a cohesive sound across the record, which from his experience, is more important in metal than in rock. While he offers no explanation, several reasons can be assumed. Metal albums often have a theme or are concept albums held together by a coherent production aesthetic. Moreover, achieving coherency with considerably different songs and arrangements, tunings, and speed of rhythmic subdivisions is difficult to achieve in music production. Since a metal record is judged by the quality of its production (Mynett, Metal 21), a high technical standard must be ensured.

Only three producers have a universal mixing system with a respective template that they use for their productions. Gene Freeman has a complex signal routing with which he processes audio material based on frequency ranges rather than instruments. Jamie King applies his template, adjusts it to the material, and mixes and masters the entire record in one session project. While Joey Sturgis has separate projects for an album, he uses a template that contains all the plug-ins, and only the signal loudness levels (“gain-staging”) need to be adjusted. According to Sturgis (“Conquer Divide”), “it’s a fully-reacting mixing template. You can put anything in it, and you can mix basically anything. The whole thing all works together.”

Presets appear even more controversial than templates. Only two producers use them regularly. Tue Madsen (“Suicide Silence”) likes to start processing with presets because they give him new ideas. Instead of creating generic sounds (Strachan 26–27), they are sources of inspiration. Taylor Larson (“Jason Richardson”) feels similarly: “I always like having a starting point, that’s why I love when plug-ins come with presets. You can go to that preset, and you don’t have to use it, but it brings you thinking about where you want to go rather than having to set everything from the ground up.” But Larson also creates presets himself. As he explains, his career as a mixer is based on the accumulation of presets (Larson, “Asking Alexandria”).

The producers do not explicitly explain their aversion to presets, but two related reasons are likely. The objective of mixing is to find a way to blend sounds so that they can coexist
and support rather than fight each other through frequency masking that occurs when multiple instruments occupy the same sonic space (Mynett, “Achieving”). Since each arrangement is different, as is the recorded audio, producers must process sounds depending on the acoustic properties and intended aesthetic vision. Presets do not allow this level of required detail and are used by, and possibly associated with, amateur producers who do not have the experience or listening abilities to process sounds as skillfully as a commercial mix demands. Adjusting settings is the core activity of mixing, and therefore the use of ready-made presets may contradict the producer’s professional self-image. One indication that producers do not reject presets per se, but wish to be seen as their creators rather than users, is that several of the studied professionals offer drum sample packs or digital guitar amplifier sounds in collaboration with commercial equipment manufacturers.

The Mixing Process

The previous section outlined overarching variables and their influence on possible standardization based on producer statements. This section analyses specific mixes to identify commonalities and variations between producers’ approaches. It starts with fundamental mixing decisions and contextual observations, then moves to individual instruments, and ends with the tools used. The focus is on the rhythm section of drums, guitars, and bass. There is a natural variance in mixing vocals due to drastically different vocal styles (Kennedy 69–76), timbres, and space within the arrangement. Typical vocal processing is covered in the context of the analyzed tools.

Contextual Observations and Mix Starting Point

Previous research has discussed the relevance of the instruments used in metal music, highlighting the central role of guitar (Berger and Fales; Herbst, “Historical”; Mynett, “Distortion”) and drums (Mynett, “Defining”; Williams) compared to bass (Mynett, “Defining” 309). In the mixes, producers spent the most time (62%) on drums, followed by vocals (19%), guitars (10%), and bass (9%). The above-average attention to drums can be partly explained by the generally large number of microphones on the kit (Mynett, Metal 69–109). Drums are also essential to the overall production quality and how modern the record will sound (Hansen, “Amaranthé”; Nordström, “Bring Me”; Odeholm, “Vildhjarta”; Putney). Concerning the bass, its relevance is viewed differently. While Jens Bogren (“Opeth”), Jacob Hansen (“Amaranthé”), and Taylor Larson (“Asking Alexandria”) do not merely see it as an extension of the guitar (Mynett, “Defining” 309), Fredrik Nordström (“Bring Me”) considers the “bass in metal music not an important instrument, but it is, at the same time, super important. But it’s not important if it is audible.” The relatively small amount of time dedicated to the guitar can be explained by the common opinion that at least 90% of the sound is created in the recording (Bogren, “Opeth”; see also Herbst and Mynett). The vocals require a greater level of attention, not only due to their central role but also, in comparison to the other instruments, due to a reduced ability to manipulate the sound at source.

96% of producers begin mixing with the drums and continue with bass or guitars; only two start with guitars. Gene Freeman explains why: “To me, this is a constant wall of guitar, and I’m very concerned with that wall of power and sound. So, I’m gonna start with my two main guitars.” Likewise, Russ Russell (“At the Gates,” “The Haunted”) tends
to begin his mixes with guitars to “see what space is left for the drums” (“At the Gates”). Given that one of the main challenges of mixing metal is the sonic density of distorted guitars leaving little room for other instruments (Mynett, “Distortion”; Turner), it may be surprising how few producers start with guitars. However, many producers bring in guitars and bass early while mixing the drums to make better-informed decisions (Bogren, “Opeth”; Braunstein).

Another technique for concentrating on the central elements is “top-down mixing.” It is sometimes defined as starting the mix with the lead elements such as vocals and lead guitars (Harding). Common in pop music, it is an approach that is adopted to ensure that the vocals are prominently featured. In the analyzed metal mixes, top-down mixing is interpreted differently. Producers mix top-down by starting with the final mix buss where all instruments and vocals are summed, instead of mixing all instruments first and the mix buss last. Only 26% do not mix top-down in this sense, possibly less, as it could not always be determined what hardware devices were in the signal chain. Within the 74% who mix top-down, there is considerable variance between those who only add a compressor and those mixing through their entire mastering chain. In the rock production tradition, most producers who mix through a compressor do so to “glue” or “gel” sound sources together (Savell; Slovak and McFarland, “August”; Udd; see also Mynett, Metal 336). However, the primary motivation is to anticipate the impact of mastering, both for the mixing process and to give the client a better idea of the final sound because the professional mix “mustn’t be demo-sounding” (Hansen, “Dyscarnate”). Drums are most affected by mastering; for example, snare hits can become quieter, and kick drums experience low-frequency attenuation (Mynett, Metal 202, 335). Therefore, to inform mix decisions, dynamic processors are introduced before mixing starts or early on (Bogren, “Opeth”; Getgood; Lancaster; Larson, “Jason Richardson”; Morton). Top-down mixing is sometimes seen as a time-saver because it reduces the need for mastering stage adjustments. As well as such adjustments having the potential to affect level (Fulk and Dunne), distortion introduced by brick-wall limiting can have unpredictable effects (Madsen, “Meshuggah”). Some producers prioritize setting up their mix buss or mastering chain to such an extent that the subsequent mixing of individual instruments is merely a “detailing” process (Churko; Lever; Sturgis, “Conquer Divide”).

There are two schools among the producers. About a quarter (26%) do not mix through any mix buss processing because they either master the mixes themselves in a separate project or send them to external mastering engineers (Madsen, “Meshuggah,” “Suicide Silence”; Otero, “Allegaeon”; Russell, “At the Gates”). For Russ Russell, mixing through a mastering chain is fatiguing (“At the Gates”), and Will Putney believes that mixing through such a chain prevents him from producing the best mix possible because it does not allow him to monitor his processing accurately. For the other 74%, mastering has become part of mixing, consistent with general developments in digital music production, where the formerly distinct phases of recording, arranging, mixing, and mastering are merging (Savage). Most producers keep their mix buss processing in their audio export, even if they send it for mastering, as it is part of the mix’s sound (King; Mader; Morton; Wade; see also Mynett, Metal 339).
**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. Regarding routing, no standard system was observed. Some producers focused their attention on individual tracks, using group busses mainly as volume faders, whereas others tried to avoid processing individual microphones favoring group-level processing. Samples used to enhance the acoustic drum recording are routed in several ways, sometimes to a subgroup for individual instruments, sometimes to the drum group, other times directly to the master buss to keep them as separate entities. Variance shows less when it comes to ghost notes played on the snare drum. All producers separate them from the main hits by copying them to a new track for different processing (see also Mynett, *Metal* 186).

The use of parallel compression significantly impacts the drum sound by supporting gently compressed drums with a heavily compressed copy. Parallel compression can increase the perceived intensity and energy of the performance without compromising clarity of the less compressed drum components (Mynett, *Metal* 214) but at the risk of emphasizing undesirable artifacts from the recorded room (Mynett, *Metal* 229). The intensity generated by this technique motivates producers like Jens Bogren (“Between”). In his experience, parallel compression evokes the impression of a drummer hitting the instrument harder than is physically possible. For this heightened intensity and added drum room, the drums are parallel compressed in 84% of mixes, yet with different approaches. Bogren (“Opeth”) uses only two busses with different compressors, whereas Churko routes the drums and a parallel compression buss into further compression and parallel distortion busses to maximize the drums’ “smack.” Tue Madsen (“Meshuggah”) likes the sound of parallel compression but generally avoids it because it suppresses the drums’ attack transients. Buster Odeholm (“Humanitys,” “Vildhjarta”), Dave Otero (“Allegaeon”), and Carson Slovak and Grant McFarland (“August”) prefer a middle way, where only the shell instruments are parallel compressed, but not the cymbals.

Parallel drum compression has already been used in classic metal albums like Metallica’s (1991) self-titled album (often called the Black Album) to create excitement and a “larger than life sound” (Tingen). Technological development and the producers’ age appear to influence the use of parallel compression. Those already working professionally at the time of Metallica’s album release, but without access to similar budgets, are still affected by the lack of resources at the time. Fredrik Nordström (“Hammerfall”) explains his scarce use of parallel compression with “you didn’t have so much outboard equipment in the old days.” Jacob Hansen (“Dyscarnate”) emphasizes the impact of advances in digital music production. Before Pro Tools 10 was released in 2011, the software did not have sufficient delay compensation to allow parallel compression because the two parts of the signal were not synchronized.

One of the main reasons for a homogenized metal sound Thomas and King identified is the hyper-precise editing of drums and their enhancement through samples. In the analyzed mixes, only 6% do not contain any samples (Browne; King; Madsen, “Meshuggah”; Savell). In line with Thomas and King’s findings, most producers consider drum sample use a necessity, but at the same time aim to use them as little and unobtrusively as possible. Fredrik Nordström explains:
I always try to make it [the recorded drums] work. It’s against my nature if you have acoustic drums to replace them with triggers. So, as much as possible, I keep the acoustic ones. This year I made two albums without triggers, only acoustic drums. This is something I put pride in to make a good drum sound if you can actually use acoustic drums 100%, that’s something I’m proud of. (Nordström, “Bring Me”)

In most productions, samples are unavoidable to achieve the dynamic consistency required for the drums to cut through the wall of guitars (Ballou; Lancaster; Larson, “Jason Richardson”; see also Mynett, “Distortion” 82). Sample use is also motivated to reduce the ratio of cymbals bleed introduced from the shell microphone sources. While some, mostly older producers like Fredrik Nordström (“Bring Me”) and Tue Madsen (“Suicide Silence”), prefer to keep some bleed for a more natural drum sound, most producers use samples to reduce it. Sample reinforcement is also motivated by adding different timbral qualities. Blending three to five samples with the acoustic instrument is common practice (Bogren, “Opeth”; Hansen, “Dyscarnate”).

Besides the sonics, performative reasons make samples necessary, according to Kristian Kohlmannslehner:

Most extreme metal drummers need a lot of rebound [the stick bouncing back after hitting the drums], so this snare is [tuned] very high; it doesn’t sound like a Nickelback snare; you just can’t tune a death metal snare that low because then the guys wouldn’t be able to play. They need the rebound for the fast blast. I’m always fighting with the drummers because I want the snare as deep as possible, and they want to be able to play. (Kohlmannslehner)

In Kohlmannslehner’s instance, samples are thus employed to change the pitch of drum instruments because pitch-shifting would introduce digital artifacts. This approach can be contrasted with the more widespread tactic of radically amplifying the high-frequency content of clean drum samples that, if applied to equivalent acoustic sources, would likely result in significant unwanted artifacts (“spill”), compromising the drum sound (Turner). Furthermore, 10% of the analyzed mixes do not contain a recorded kick drum, only a trigger signal, as it would be more work to create the sound from the acoustic kit than from samples (Kohlmannslehner; Levi, “Chelsea Grin”). In a further 10% of productions, the kick drum is recorded separately to better edit the performance (Churko; Freeman; Mader; Wade). The shells are not replaced in other studied productions, but what would normally be organic ambiance captured at the recording stage is instead provided by software triggering ambient drum samples (Lever; Otero, “Allegaeon”). Several drum productions have all their shells replaced (Freeman; Udd; Wanasek, “Cognizance,” “Machine Head”). In 16% of all mixes, the drums are entirely programmed (Braunstein; Churko; Fulk and Dunne; Odoholm, “Humanitys,” “Vildhjarta”; Smyth; Sturgis, “Vesta Collide”). However, using a programmed performance does not render samples redundant because they serve to create “heightened reality” (Smyth), suggesting that sample use is not only motivated to compensate for lacking sonics resulting from the performance but is also an aesthetic decision.

In the choice of samples, some variance shows between the producers. A minority have favorite samples they use across different records, possibly contributing to a homogenized sound or signature (Larson, “Asking Alexandria”). Most producers select samples for each album and song (Bogren, “Opeth”; Kohlmannslehner; Russell, “At the Gates”). Sometimes they use various samples in different form parts because of varying
rhythmic subdivisions or sonic weight (Larson, “Asking Alexandria”; Mader; Morabito; see also Mynett, Metal 181–82) or mute samples altogether in sparse parts or intricate fills (Bogren, “Between”). On the one hand, this practice suggests a standard approach; on the other hand, it demonstrates the level of detail in the use of samples. The producers create samples themselves, paying meticulous attention to detail. To keep them from sounding robotic, Jacob Hansen ("Amaranth") records eight hits for eight different velocity levels: a total of 64 samples. Kristian Kohlmannslehner creates different samples of left and right hand and foot to humanize his samples further (see also Mynett, Metal 104–06, 178). A common practice is expanding a producer’s own samples with commercial drum sample packs, Toontrack’s Superior Drummer above all. However, professional producers see these mainly as support (Odeholm, “Humanitys”) because laypersons use them too and may recognize the sound. Such blending also helps to avoid a standard drum sound.

More variation was observed in whether producers align the phase of the drum microphones. 14% phase align, but only the older producers. Jens Bogren ("Opeth") manually moves the waveform to improve the phase; Jacob Hansen ("Dyscarnate"), Dave Otero ("Allegaeon"), and Fredrik Nordström ("Hammerfall") use dedicated software. How overhead microphones are panned in the stereo field suggests similar generational differences. Older producers (Madsen, “Meshuggah”; Russell, “At the Gates”; Nordström, “Bring Me”) tend not to spread the cymbals wide, emphasizing they want to create a more natural sound, not giving the “drummer way too long arms” (Madsen, “Meshuggah”). Overall, 84% pan as wide as possible for a modern hyper-real sound (Mynett, “Heaviness,” “Maximum”).

The room sound remains essential to the drum aesthetic, regardless of the reliance on spot microphones and samples (see Mynett, Metal 191). Standard techniques for processing rooms include filtering and compression. 64% filter out the low and high frequencies to create the impression of a larger recording space (King; Morton) or to emphasize shells over cymbals (Kohlmannslehner; Otero, “Allegaeon”; Wanasek, “Cognizance”), especially when the rooms are compressed or distorted to avoid harshness (see Mynett, Metal 100). The remaining 36% do not explain why they do not bandpass-filter their rooms.

Compressing the room is even more common (88%) than filtering. Motivations are adding “smash” (Otero, “Khemmis”); “explosion” (Odeholm, “Vilhjarta”); enlarging spaces by emphasizing ambiance (Morton; Slovak and McFarland, “Rivers”; Wanasek, “Machine Head”); body and low-end (Hansen, “Amaranth”); emulating the experience of being in the room with a loud drummer (Braunstein); excitement; lengthened drum sounds (Otero, “Allegaeon”). The way these effects are achieved varies. Some prefer broadband or multiband compressors; others choose limiters, distortion, and transient designers, or a combination of these. The intended aesthetics range from creating a believable impression of a drum kit in an acoustic space (Madsen, “Meshuggah”) to purely artificial ambiance for ultimate control (Morabito).

**Guitars**

The producers spend considerably less time on guitars than on drums because they are convinced that most of the sound is created in the recording (Herbst and Mynett). Standardization was analyzed regarding amplification technologies, filtering, and the stereo field.
Previous research has highlighted metal producers’ reluctance to record technologies other than analog valve amplifiers (Herbst, “Old”; Mynett, Metal 57). The data paints a different picture; half (50%) of the mixes employ digital amplifier simulation plug-ins from Neural DSP, Toneforge, and Line 6, hardware simulations like Fractal Audio AxeFX and Line 6 Helix, and profiles of analog devices created with Kemper’s Profiling Amplifier. Here again shows a generational effect. Younger producers who mix metalcore and djent, such as Taylor Larson (“Jason Richardson”) and John Browne, prefer software-based approaches, which aligns with Shelvock’s analysis of the djent guitar sound. Several older producers remain unconvinced by digital amplifiers (Hansen, “Amaranthe”; Nordström, “Bring Me”) or even reject the widespread practice of re-amping guitar performances (Russell, “The Haunted”). Their rejection of digital alternatives may be rooted in conservative attitudes based on experience and familiar working practices, in actual perceived inferior audio quality, or the possible exploitation of accumulated technological capital (Herbst, “Old”).

Over time, the guitar’s frequency spectrum in metal has extended in the lows and highs due to increased distortion levels (Berger and Fales; Herbst, “Historical”). The data show that in 56% of all mixes, guitars are processed with a low-pass filter to reduce harshness (Nordström, “Hammerfall”) and make space for other instruments like cymbals (Russell, “The Haunted”). The exact threshold frequency varies but is usually between 5 and 10 kilohertz. More consistency exists in removing other harsh frequencies, as most producers attenuate around 4 kilohertz (see also Mynett, Metal 300). However, there is less variation where such filtering takes place. Rather than individual tracks, most process the guitar subgroup, with notable exceptions being Jacob Hansen (“Dyscarnate”) and John Browne.

Besides the abrasive high-end, controlling the guitar’s low-end is crucial for a modern metal sound (Mynett, Metal 244). In the early 2000s, influential producer Andy Sneap posted a screenshot of his Waves C4 multiband compressor settings on the Ultimate Metal message board. His solution to tame excessive bass on palm-muted guitars by compressing only the relevant frequency area was widely discussed and often copied. The observations suggest that this approach is still practiced but becoming less common (43%). Perhaps surprisingly, the main alternative, generally preferred by younger producers, is limiting the entire guitar signal (King: Levi, “Chelsea Grin”; Sturgis, “We Came”; Wanasek, “Cognizance”) or using broadband compression (Browne; Slovak and McFarland, “August”). Limiter are the tool of choice for some because they control volume without coloring the sound as much as compressors (Wanasek, “Cognizance”).

The producers’ approach to the guitar’s stereo field shows little variance. 94% spread the guitars fully. Far less common is artificially widening the guitars (15%). Altogether, processing options are limited because the guitar’s sound is largely determined before the mix begins (Herbst and Mynett). The greatest variance, which affects the entire mix is spectral content manipulation (Mynett, “Distortion”; Turner).

**Bass**

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. Only one producer (Mader) relies solely on a recorded bass amplifier. 78% either mix the DI
with a recorded real amplifier or processed copies of the direct signal. Among this group, varying numbers of tracks are used, but the standard approach is to employ the direct signal for consistent low-end and note definition and an amplifier for a distorted sound with bass frequencies attenuated, which affords the bass and guitar with sonic glue (Mynett, Metal 145, 190). Several producers opt to use three layers for manipulating the relevant frequency regions, thinking in semantic terms like “clank,” which refers to higher frequency string noise (Hansen, “Amaranthe”; Kohlmannslehner; Larson, “Asking Alexandria”). Popular among producers using Pro Tools is the stock bass amplifier simulation SansAmp PSA-1. When third-party simulations are chosen, they tend to be emulations of Ampeg amplifiers. Not all producers though use amplifier simulations; some prefer distortion plug-ins.

One of the central challenges when mixing metal music is low-end management, with the kick drum and bass relationship crucial to a successful production (Mynett, Metal). Not surprisingly, all producers are controlling excessive bass dynamics with often radical compression and limiting. Additionally, “duking” the bass during a kick drum hit, which allows for a weightier bass sound that does not mask the kick (Mynett, Metal 241), is used in 26% of mixes. There is variance within this group given that some duck the entire bass signal (Churko; Hansen, “Amaranthe,” “Dyscarnate”) while others only the bass frequencies (Ballou; Freeman; Morton). Among those who duck the entire bass signal is Jacob Hansen (“Dyscarnate”). He prefers to create audible pumping, similar to EDM, because it adds loudness and a sense of aggressiveness that benefits heavy music. Only Jens Bogren (“Opeth,” “Between”) has a different system to control bass. Instead of treating the bass separately from drums, he routes the bass through the main drum buss to produce a more “organic sound.” 74% do not use ducking, highlighting the following motivations: to keep the processing simple (Madsen, “Suicide Silence”; Savell); out of habit (Nordström, “Bring Me”); to create overtones that make the bass more audible on smaller speakers (Smyth); being principally opposed to ducking (Browne; Larson, “Asking Alexandria”).

The data suggest that mixing bass follows a relatively standard approach and that only a few producers do not conform. Taylor Larson (“Asking Alexandria”) likes to add a chorus effect on the highest bass layer, a technique Russ Russell (“The Haunted”) sometimes chooses too. Similarly, Jacob Hansen (“Amaranthe,” “Dyscarnate”) artificially spreads the bass above 500 Hz in stereo, not to make it blend better with the guitars but to emphasize aggressive string “clank,” which helps the instrument stand out in the mix. According to Adam Getgood, Periphery’s signature bass sound is created with reverb, which goes against the general advice in metal production to refrain from adding reverb to bass or rhythm guitars (Mynett, Metal 316).

Tools

Studying the various mix approaches indicated that there is a tendency toward particular tools. Regardless of age, several producers use hardware, but only Daniel Bergstrand mixes completely analog, employing his DAW merely as a tape machine. All others work mostly or entirely digital. Avid Pro Tools (68%) remains the standard production platform in metal music, followed by Steinberg Cubase (22%), Apple Logic (8%), and Cakewalk Sonar (2%). Younger producers tend to opt for alternatives to Pro Tools.
Compression shapes the sound of popular music, and specific compressors like the Urei/Universal Audio 1176 are a popular choice for their distinct coloration (Moore). Metal mixes appear no different because vocals are treated with the 1176 compressor in 61% of the mixes, although most were already compressed with a hardware 1176 during recording (see also Herbst and Mynett). It is also a common choice on parallel drum busses and individual instruments. Popular digital emulations include the affordable version from Waves (CLA76) and Bomb Factory, a stock Pro Tools plug-in. Modern adaptations like Softube’s FET compressor are preferred for drums, as they offer additional features that allow ignoring bass frequencies to obtain coloration without pumping.

When it comes to modulation and other production effects, Soundtoys products occupy a unique position. Their two most popular plug-ins are the delay Echoboy (44%) and distortion unit Decapitator (36%). The percentages may seem low, but they come close to an industry standard, given the abundance of available plug-ins. For delays, the common alternative is Waves’ H-Delay, which has a more digital sound than Echoboy’s analog emulations. Decapitator distortion, emulating pre-amplifiers of classic console manufacturers like Neve or tape machines by Ampex, is frequently applied to vocals to add aggression and is used as an envelope shaper and harmonic generator on drums.

Another plug-in bundle used in 72% of mixes is from Fabfilter. Although it includes a range of tools, the most popular plug-ins are the equalizer and multiband compressor due to their spectral visualization, dynamic features, and the option to control the signal by another instrument (“side-chaining”). Plug-ins from a pioneer of digital audio processing, Waves (since 1992), remain popular. One of their most popular plug-ins is the limiter L1, used in 60% of mixes to reduce dynamic range, especially bass, guitars, and vocals.

The available tools either emulate classic analog hardware or are purely digital (e.g. Fabfilter). Producers like Otero (“Allegaeon”) and Slovak and McFarland (“August”) state that because of having developed their engineering skills in a DAW, analog emulations do not feel natural to them. They prefer the “more intuitive” digital tools that offer visual information and do not color the sound. Others like Bogren (“Opeth,” “Between”) and Hansen (“Amaranthe,” “Dyscarnate”), trained on hardware, achieve most of their sound with analog emulations and employ digitally designed tools only for surgical corrections. No generational effects could be observed. 84% of all mixes contain processing with emulations of the British console manufacturer Solid State Logic (SSL). Their E series’ channel strip is commonly used to process individual instruments, whereas their G series’ master buss compressor is popular on instrument busses and the stereo buss.

Joey Sturgis (“Conquer Divide”), producer and plug-in designer, reflects that “you kinda get stuck in this rut where you’re always pulling up the same stuff that you would normally use because you have told yourself in your mind so many times that’s the thing you need to use.” He argues that the number of high-quality plug-ins has multiplied in recent years, helping producers break out of their routines. Our observations suggest otherwise; although appreciating digital functionality, producers tend to use a limited range of tools and choose analog gear emulations existing since the 1960s or 1970s. For all the alleged extremity in mixing (Turner) and hyper-real sounds (Mynett, “Heaviness,” “Maximum”), and likewise, despite views that metal music has evolved through technological advances (Thomas; Williams), the most popular tools are based around analog-style processing.
Statistical Analysis

Significance tests can determine whether systematic correlations and variance exist between groups or factors. Analyzing practices in mixing (heavy) metal, extreme metal, and metalcore revealed only two significant differences. Stereo width enhancing the guitars was more common in metalcore than metal ($p < .05; \eta^2 = .12$), whereas using analogue emulations was more prevalent in metal than metalcore ($p < .01; \eta^2 = .24$). This result suggests that metalcore producers place less emphasis on mono compatibility and analog sounds, both of which are characteristic of a more traditionalist approach. All other analyzed parameters show an average variance of $\eta^2 = .03$, which is statistically a minor effect, and it is not significant. This lack of variance indicates that producers mix metal’s different subgenres in a similar way, which supports the hypothesis of standardization.

The most variation appears to be generational. Comparing the producers’ experience with processing decisions shows few but significant correlations. Younger producers are more open to programming drums ($p < .001; r = .41$) and bass ($p < .001; r = .40$). They embrace the functionality and sound of guitar amplification simulations ($p < .001; r = .59$) and the aesthetic of dynamic limiting ($p < .01; r = .37$). Older producers tend to prefer more conventional mix tactics, as statistically indicated by them not panning the overhead cymbal microphones fully wide ($p < .001; r = .44$) so as not to create an unnatural stereo field. However, conversely, they also pay more attention to drum phase aligning that can only be done in the computer ($p < .001; r = .44$).

Overall, the relatively small number of systematic differences allows two possible interpretations. A standard in mixing metal music could exist independent of personal or music-related factors, or else, the producers’ approaches are so individual that these cannot represent a universal system. Neither explanation finds ultimate support by the qualitative analysis. Most producers take a similar audio processing tactic, which might reflect a standardized methodology. Apart from expected sound aesthetics (Thomas and King), this mostly uniform approach could be explained by the physics involved in mixing (Mynett, Metal), supporting the claims that producers emphasize the technical over the creative aspects of their work (Thomas 205). However, the mix analysis has shown various options within the generally similar approach, suggesting producers still have leeway for their own system.

Conclusion

The democratization of digital production resources and specialist knowledge has affected professional metal producers operating small independent businesses. All but one of the analyzed producers work fully digitally and choose similar tools. Concerning the question of standard mixing methodologies, the findings are broadly consistent with Thomas and King’s conclusion that metal music production follows a standard approach based on an accepted value system and expected sound aesthetic. Producers see themselves as realizers of visions, helping their bands adhere to aesthetic norms when desired. Careful not to repeat themselves, many avoid comprehensive processing templates and presets and go to great lengths to create personalized sounds. Nonetheless, the mixing process and decisions follow a certain logic. Standard practice is determined less by the pressures of convention (Thomas and King) than by acoustic laws. Mixing music containing fast and complex rhythmic subdivisions, sonic
density, and weight must be scientific to maximize what is acoustically possible to produce the desired combination of clarity, heaviness, and hyper-real sounds (Mynett, Metal). If there is a perceived pressure to conform, it results from the genre’s fundamental pursuit of greater heaviness (Berger and Fales). To achieve it, producers push acoustics to their limits, which inevitably requires transgressing what could be considered standard approaches.

The findings suggest that producers follow a vaguely defined mixing methodology largely because the nature of acoustics, as it applies to the recorded representation of metal music, requires it (see Mynett, Metal). Variation comes into play when there are two or three mainstream solutions to acoustic challenges. Those having individual approaches to mainstream strategies, or finding entirely new ways, are among the most successful. Producers are aware of technical demands, but they ultimately take creative technical decisions (see Herbst and Mynett). Frith and Zagorski-Thomas (3) posit that in “the studio technical decisions are aesthetic, aesthetic decisions are technical, and all such decisions are musical.” This correlation is evident in the mix sessions observed. By rejecting strict formulas and deviating from standard practice, the producers facilitate artist individuality.

One might assume that individual approaches and expert knowledge would be treasured because most producers use similar tools that are also available to nonprofessionals. What the videos reveal comes perhaps as a surprise. Mutual support is discernible on a large scale. Rather than keeping “production tricks” to gain a market advantage, producers willingly share their mixing approach. Sometimes they refer to their colleagues’ tutorials that gave them inspiration for something new. These are indications that democratization of knowledge may not lead to standardization but instead inspires exploration of new production approaches in the community. Resulting from affordable digital music production resources, the growing number of competing producers do not oppose joint learning and development; a communal spirit and collaborative ethos leave sufficient space for individuality and creativity.

**Data Access Statement**

The mixing decisions were compiled in a spreadsheet. Both the spreadsheet and the SPSS file used for the statistical analysis can be accessed in this location: https://doi.org/10.34696/tk4n-cv52

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