

# A Content Analysis Study of Distortion's Influence on Drum and Bass Music Production

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## Abstract

This study uses content analysis and draws upon aesthetic theory and technological determinism as theoretical frameworks to explore contemporary approaches to the use of distortion within drum and bass production. To achieve this, it investigates online video tutorials created by professional drum and bass producers and online content creators to gain insights into their common working practices when using distortion in their work. The analysis highlights a prevalent use of aggressive distortion to transform bass timbres, which is a trend originating in the 1990s that continues to shape the genre's evolving aesthetic. Producers utilize built-in synthesizer effects for expedient distortion during sound design and specialized plugins for more intricate work during the final mix. It is also revealed that they use distortion to increase the texture of parallel processed audio groups, enhance the timbral attributes of percussion sounds and create general mix cohesion. Interestingly, despite the potential for significant experimentation among content producers, most

tutorials focus on recreating established distortion techniques, showcasing a preference for re-construction over creative deviations from the norm. This research provides unique insights into the evolution, and impact of distortion and shows how established techniques persist while subtly evolving within the ever-changing production ecosystem.

**KEYWORDS:** Distortion, drum and bass, music production, content analysis, aesthetic theory, technological determinism

## Introduction

As Mead et al. (2023) note, distortion is “usually considered as the altering of something into an unintended shape”. In a technical sense, an audio signal becomes distorted when the output does not resemble the input, specifically when the shape of the waveform is altered due to the limitations of a hardware component or non-linear saturation processing in a software algorithm. This, in turn, changes the signal's sound by adding additional harmonics, and depending upon the magnitude of the distortion, can range from a subtle change in timbre to aggressive clipping. The first use of significant distortion as a clear production aesthetic in drum and bass occurred in approximately 1995 when the sub-genre techstep became popular. This aggressive style developed as a departure from the melodic and jazz-influenced drum and bass created by artists like LTJ Bukem and Goldie. Pioneering figures within techstep, such as Dom and Roland and Ed Rush and Optical played a pivotal role in establishing distortion as the key aesthetic element and their experimentation with analogue hardware devices led to the integration of distortion as a defining characteristic of the genre (Shields et al, 2024). As time passed, techstep gave birth to neurofunk, a sub-genre that one can argue is the most distorted of all drum and bass styles. Leading neurofunk artists such as Noisia, Current Value, Mefjus, and Phace rely heavily on distortion as a key ingredient in their productions and apply it to many musical sources. Their work is characterised by layers of distorted timbres, modulated and articulated to generate a sonic signature that is paradoxically ugly and beautiful.

This paper uses content analysis to explore contemporary approaches to designing distorted sounds in drum and bass. It identifies standard tools and techniques, considers the shift from analogue to digital methods, and how this evolution has impacted producers' choices. Moreover, it examines whether the current generation of producers still exploits analogue-influenced methods and analyses the motivations behind their approach to distortion. The study was underpinned by the framework of aesthetic theory to explore how distortion is used to subvert the standard norms of music production and technological determinism (McLuhan, 1994) to observe the affordances, evolution and democratization of distortion technologies. The following sections present a brief overview of these frameworks to contextualize their usage in the current study.

Aesthetic theory is a broad field that examines the nature of the human experience of the sensory world, including our perception, interpretation, and appreciation of many art forms, including music. In the context of music production, aesthetic theory provides a framework for understanding how technological tools and creative practices shape the experiential qualities of music.

A key consideration from an aesthetic perspective in this paper is the intentional use of distortion, a process where audio signals are intentionally degraded and

'broken' is celebrated and adopted as an intrinsic part of the sound. Distortion can move the listener towards re-signification by creating a multi-layered auditory experience. Young (2023) argues that distortion emphasises imperfections, noise and differences to challenge normative structures and hegemonies. Thus, distortion is not exclusively a technical anomaly but an artistic choice to subvert traditional notions of beauty and perfection. One could argue that these distorted sounds evoke a sense of beauty in the listener and stand in opposition to the clinical and clean sounds common in much popular music of the 1980s and 1990s. This highlights how aesthetic values are constructed through culture; distortion in one context may be viewed as ugly and something to avoid, while in the context of drum and bass, it is reclaimed as a carrier of the genre's sonic signature.

Technological determinism is the idea that technology significantly influences social change and human behaviour (Adler, 2006). This notion is prevalent when discussing music production, as the field assumes that new technologies inherently shape creative practices. For instance, the development of electronic instruments, digital audio workstations, and production software, is often seen as driving fundamental changes in how music is composed, produced, and distributed (Pinch & Trocco, 2002; Magnusson, 2009). Adler (2006) contends that technological determinism becomes more plausible over longer timeframes, aligning with how major shifts like the analogue-to-digital transition have transformed music production over decades. Proponents of this view might argue that technological advancements have autonomously led to new genres and techniques. For example, the authors of this paper suggest this perspective helps explain the role of relatively inexpensive hardware distortion in the emergence of tech-step.

Finally, the concept of "affordances" popularised by Gibson (1979) from ecological psychology has also been utilised in this study. This idea has been applied to studying how technological tools, including music production technologies, shape creative practices and aesthetic outcomes. The affordances of specific distortion processors and plugins, for example, may encourage specific production techniques and discourage others, thereby shaping the aesthetic outcomes.

## Related Literature

Directly related literature on the subject of this chapter is fairly scarce. Apart from previous work by the authors (Shields et al., 2024), there is no other research into the use of distortion in drum and bass production. However, a reasonable number of cutting-edge sources focus more generally on distortion in music production and can offer valuable insights into its historical evolution, terminology, and perceptual qualities.

Mead et al. discuss how distortion is introduced to audio signals and present a historical timeline of distortion, highlighting the early and unintentional use of distorted guitar sounds to explicitly designed digital distortion devices purpose-built for the distortion of all forms of audio signals. Their findings highlight how distortion has been adopted as an intentional aesthetic device in modern music production and is often an iconic ingredient in specific productions and genres (Mead,

Bromham and Moffat, 2023). Bromham (2023) investigates the language used in music production to describe the sonic attributes of distortion and colouration. Using a semi-structured interview approach, their work details the semantics used to describe the sound of distortion and insights from this study can help us understand how producers in the drum and bass genre communicate their creative vision through distortion.

Similarly, Rice and Moore (2023) explore descriptors used specifically for guitar distortion pedals to develop a lexicon for distortion. Using a mixed method of content analysis and an audio-based listening experiment, they explored the descriptors used to categorise the sound of four iconic distortion pedals over various gain amounts. Their work uncovered a lexicon of descriptors for distortion pedals and provided some important insights into understanding the common parlance of drum and bass producers.

Coghlan (2023) studies the preference groups of recordists have for particular vintage hardware signal processors and how they use them to impart distortion in their music productions. The study explores how the use of specific vintage hardware units persists despite the availability of more modern counterparts. Their findings suggest that the reasons for this are multifaced but include the idea of “buying in” to a culture, the colouration effect of the devices, workflow and the potential for misuse of the device. Again, this work provides context for the current study's examination of why contemporary drum and bass producers still exploit analogue-style distortion methods in the digital era, a question which will be explored later in the chapter.

Poss (1998) argues that distortion is an essential part of the aesthetic in popular music production and argues that the clean and uncoloured sound of certain solid-state and digital music production equipment is directly opposed to this aesthetic. Although this article is reasonably dated, and the shift away from transparent music production devices started a few years after its publication, its viewpoint informs the current study's exploration of distortion use in drum and bass. It helps us understand why music producers select devices and techniques to deliberately distort their audio sources in ways that might be considered antithetical to those who aim to achieve perfectly transparent productions free from artefacts.

Herbst (2019) focuses on distorted guitar tones in rock music and explores the connection between guitar players and their choice of equipment, specifically looking at their attitude towards equipment and whether it is grounded in assumptions that specific instruments fit specific genres. The study uses a mixed method, utilizing a questionnaire and interview format. The results highlight that there is a close relationship between musicians' equipment choices and genre conventions, and these findings can help us understand how drum and bass producers approach distortion through the use of specific types of distortion that match the expectations of the genre.

Womack and Green (2016) demonstrate the creative use of distortion tools in Hip-Hop music, showcasing techniques that can add grit and aggression to the mix. Their study examines how distortion can be used in hip-hop productions to alter a musical source's timbral impression and aesthetic. Like Poss, they argue that distortion is a prerequisite for music productions that require character and vibe. These findings are pertinent to drum and bass as it shares much of its sonic signature with hip-hop, particularly the use of breakbeats and sub bass. This is not surprising

as Murphy and Loben (2021) note that hip-hop was one of the musical ingredients that was blended to create drum and bass in the early 1990s.

Finally, on a more technical level, Wilson and Fazenda (2014) analyse the auditory impact of distortion in musical recordings and classify them based on their distortion character, using low-level audio descriptors and in-depth statistical analysis. Although their approach differs from the one used here, it helps us understand why drum and bass producers select specific styles of distortion to influence musical elements in their productions.

The literature in this review has shown that while directly related literature is scarce, some cutting-edge sources provide valuable insights pertinent to the present study. Specifically, these studies have explored distortion's evolution, the language used to describe it and its perceptual impact on music genres. Collectively, these works provide a strong contextual platform for this study's exploration of distortion in drum and bass production and will help unpack the motivations behind its use.

Before an overview of this study's methodology and a discussion of its results, it is worth considering two higher-level findings that emerged from the research: the impact of democratization and 'preset culture'.

## Democratization of the Production Environment

Previous work by the authors found that iconic drum and bass productions from the mid-90s to early 2000s were produced using hardware devices to impart distortion, either by deliberately clipping the inputs of mixing consoles, driving hardware samplers, or using guitar distortion pedals in the signal path. Analysis for the current study, focusing on video content from 2012 to 2023 (with approximately 70% of videos being uploaded in the last 5 years) shows that distortion is now generated entirely using software devices, many of which are relatively low in cost or included as stock plugins in a Digital Audio Workstation (DAW). Thus, modern music production, driven by technological advancements and the development of the internet, has undergone a substantial transformation, which has led to increased accessibility and democratization of the production process. In the past, access to professional recording studios and costly hardware equipment acted as a barrier, particularly limiting participation in the music production process to those with the financial means. However, laptop studios have emerged as viable alternatives due to the development of powerful computer processors, cutting-edge software development and affordable recording equipment that often rivals the quality of professional equipment; this transformation has been facilitated by the affordances of technology, enabling individuals to create high-quality music in diverse environments (Goold, 2018).

The democratization of music production, influenced by technological determinism, has expanded the scope of participation and allowed both amateurs and professionals to express their musical ideas using equipment of equivalent quality (Arditi, 2014). One can also posit that this democratization has been enabled by dismantling traditional power structures in the music industry, providing a platform for a larger group of people to engage in creative practices (Walzer,

2023). Furthermore, the internet has played a crucial role in this democratization process by offering aspiring music producers access to a wealth of learning resources online, such as YouTube tutorials and discussion platforms like Reddit that feature 'sub-Reddits' on all aspects of the music production process. This shift in knowledge dissemination aligns with the principles of technological determinism and provides an excellent example of the influence of technology on changing social relationships and educational practices (Horning, 2004).

## Audio Plug-Ins and Preset Culture

Within the current study, a recurring finding is the prominent use of audio plug-ins as the primary source of distortion. The transition from analogue to digital technologies has played a pivotal role in establishing audio plug-ins as standard tools within the industry. While fields like photography and videomaking have embraced various technological advancements such as facial recognition, red-eye removal, and auto-stabilization techniques, music production has embraced a smaller number of advancements, with the most notable shift being towards plug-ins (Moffat and Sandler, 2019). However, despite production incorporating comparatively few technological shifts, the impact of plug-ins on the process has been significant. This shift aligns with the principles of technological determinism, highlighting the influence of technology on creative practices.

Producers frequently utilize their understanding of plug-in parameters to craft distinctive sounds, employing both technical and creative approaches to manipulate parameters. On the other hand, an alternative, more expedient approach is also prevalent, with producers utilizing preset banks provided by the software. This widespread use of presets has led to the emergence of what one could label "preset culture" (Paterson, 2011; Lefford *et al.*, 2021). In certain genres, such as dubstep, the prevalence of specific presets has contributed to a homogenization of sound, as these presets become widely employed across different productions. This phenomenon further emphasizes technological determinism's influence, as presets and their ease of use shape the characteristics of a musical genre and contribute to its sonic standardization.

## Content Analysis Method

The following sections present the methodology employed in this study, including the content analysis approach used and the selection criteria implemented to select appropriate videos for analysis.

Sommer (2006) notes that content analysis "is used to systematically summarize written, spoken or visual communication in a quantitative way". Treadwell (2013) states that content analysis can be a quantitative technique requiring the researcher to count the occurrences of whatever interests the study. However, it can also involve qualitative approaches to understand the symbols and themes of the analysed content. A profound benefit of the method is that it is unobtrusive and does not require direct contact with people. Furthermore, many content analysis studies involve looking at samples of the media, television, film and internet sources, which means it is a relatively cost-effective analysis method. Examples of

content analysis include examining the frequency of occurrence of themes in films and television, understanding the narrative in political speeches or exploring how a specific artist uses colours. Busch et al. (1994) and Neuendorf (2002) provide a thorough overview for further information on the method.

Content analysis has been used in related studies, often in conjunction with other methods. Rice and Moore (2023) used text mining and a variation of content analysis to understand better the language used to describe distortion pedals. Ronan et al. (2015) used content analysis with grounded theory to explore the lexicon used to describe analogue compressors. Moore (2017) also used a similar approach to investigate how music producers used compression in their work.

This study used content analysis to explore the most frequently used forms of distortion, the commonly distorted musical sources and to understand the motivations for applying distortion in contemporary drum and bass production. The following section explains how video content was selected for analysis and outlines the selection criteria.

## Video Selection

This study analyses content sourced primarily, but not exclusively, from YouTube. The content is split into two categories: tutorials created by professional established producers who have released music over a number of years on leading drum and bass record labels, and those created by music production tutorial creators who either have no commercial music releases or do not have releases on leading recording labels. The two groups will be referred to from here on in as professionals and content creators. The selected videos underwent rigorous scrutiny, and only those with a large focus on distortion were used in the analysis.

The corpus of videos with professionals consisted of 23 videos featuring producers explaining their working methods and providing tutorials on achieving the sounds with which they are most associated. A selection criterion was created that assessed whether the video content represents current practices and provides an accurate account of contemporary production methods. Selected videos featured professional producers with respected status in the community and a consistent output of releases on leading record labels.

Ten content creator videos were analysed for the study, and a selection criterion was implemented so that the analysis would only focus on content creators who were considered to have impactful outreach. Previous studies have noted that view counts in the hundreds reflect a social rather than mass audience (Lange, 2019) and that videos with over 5,000 views are considered influential and representative of accepted practices. The content creator videos chosen in this study have view counts between 7,000 and 25,000 and thus represent accepted practices.

Many other videos explored drum and bass distortion techniques but did not meet this viewership threshold. However, a cursory review of these videos showed that the content creators utilised similar software tools and production techniques for distortion. Thus, despite not meeting the view count criteria, these sources indicate shared approaches across the wider sphere of online tutorial content. Additionally, it is worth reasserting that the date range of the YouTube video

uploads provided spans from 2012 to 2021, capturing a significant period of evolution in music production techniques and genre trends.

## Results

This section explores the content found in the videos, covering two key aspects: distortion plugin preference and the application of distortion on different musical sources. The focus on distortion plugins offers valuable information on the tools used to impart distortion in contemporary drum and bass production, and looking at the application of distortion highlights patterns and preferences in how both groups use distortion.

### Results: Plug in preference

Table 2 presents a summary of the most frequently used distortion plug-ins. Analysis shows that built-in software distortion on virtual synths is a common choice. The popularity of these distortion devices may be partly due to workflow reasons, specifically their ability to expedite the sound design process and maintain creative flow that could be broken by searching for external plugins. Producers can focus on their sound design when working in this way, as all the required tools are available under one user interface.

It is important to note that built-in synth distortion effects were only applied to sounds created within the instrument as part of the synthesis sound design process rather than processing external content such as drums, vocals, instrument groups, etc. These types of sources were typically distorted using specific third-party analogue-modelled plugins, such as CamelPhat and Trash 2, which are popular as they afford producers more creative choices and a broader range of distortion styles; they allow producers to switch between many different parameters and colours of distortion, thus offering a more powerful and detailed approach to distortion.

In contrast, stock plugins from the DAW were infrequently used, suggesting that producers seek out what they perceive as higher-quality distortion devices. This preference may stem from word-of-mouth recommendations within the community or adhere to standard working practices aligning with Herbst's findings that genre expectations often dictate the selection process of equipment (2019). Additionally, the prevalence of analogue modelling distortion plugins (Decapitator, Driver and Vintage Warmer) indicates a desire to emulate the older style of working from the early days of distortion in drum and bass. This demonstrates that modern artists feel a desire to embrace the genre's distortion heritage, which they achieve by integrating new technology. Essentially, they are respecting the genre's roots while exploring new ways to create its iconic distorted sonic signatures and perhaps even expand upon them.



<b>DAW</b>	<b>Professional Producers</b>	<b>Amateurs</b>
Cubase	35%	0%
Ableton Live	26%	90%
Logic	13%	0%
FL Studio	13%	0%
Studio One	4%	0%
Phaseplant	4%	0%
Bitwig	0%	10%

TABLE 1. Distortion Plugin Preference among Professionals and Amateurs in Drum and Bass Production

One point worthy of note when comparing professionals to content creators is that professionals employ a broader range of distortion plugins. This suggests a greater propensity to experiment with a diverse range of tools to achieve their desired sonic outcomes. In contrast, content creators demonstrate a higher reliance on inbuilt distortion, relying more on the capabilities of their chosen DAWs for distortion processing.

However, it is important to consider the inherent variation between the two data sets. The content creators featured in video tutorials may deliberately utilize distortion plugins that are familiar to their audience, aiming to provide accessible and relatable content that does not require their viewers to invest in costly software plugins. This approach could potentially limit their exploration of a wider array of distortion tools and, in turn, limit their viewers' experimentation.

Table 2 shows how frequently the video content discussed various musical sources in the context of distortion and presents the results as percentage portions. Bass emerged as the most frequently distorted element, an approach that aligns with its longstanding significance in shaping drum and bass's sonic signature since the mid-1990s. The other elements, namely leads, drum groups, bass groups, and individual drums, constituted 15%, 15%, 12%, and 6% respectively. Notably, distortion on individual drums was less common compared to other sources. Although the reason for this was not made clear in the video content, this observation suggests that drum and bass producers may prioritize preserving the transient detail of individual drums, such as the kick and snare, as distortion could diminish the perceptual attribute of punch, which as noted by Fenton (2019) heavily relies on strong transients.

Upon comparing the two groups, professionals and content creators, similarities emerge in the distribution of discussions, particularly highlighting the significance of bass distortion. Professionals and content creators emphasise distorting bass sounds, again highlighting its significant role in shaping the unique sonic signature of Drum and Bass music.

<b>Plugin</b>	<b>Professionals</b>	<b>Amateurs</b>
Camelphat	20%	0%
Izotope Trash 2	20%	8%
NI Massive Built-In Distortion	10%	0%
Camelcrusher	7%	0%
Psp Vintage Warmer	7%	0%
Fab Filter Saturn	7%	9%
Phaseplant Built-In Distortion	3%	0%
Guitar Rig	3%	0%
Vital Built-In Distortion	3%	36%
Soundtoys Decapitator	3%	0%
NI Driver	3%	0%
Logic Stock Plug-In	3%	0%
Cubase Stock Plug-In	3%	0%
Ohm Force Ohmicide	3%	0%
Izotope Exciter	3%	0%
Serum Built-In Distortion	3%	27%
Ableton Bulit-In Distortion	0%	9%

TABLE 2. Distribution of Time Spent Discussing Distortion on Musical Sources by Professionals and Amateurs in Drum and Bass Production

## Discussion: Professional producers

The following sections explore key excerpts from the analysed videos to understand the producers' motivations better. The videos will be analysed by musical sources, and the reader will be provided with both technical and creative discussions for a comprehensive overview of the content.

### Bass

A predominant theme that emerged was the use of aggressive textural distortion, often from multiple instances of distortion, applied to bass lines of all kinds, ranging from those featuring long sustained notes to those with complex rhythmic patterns. In a video tutorial, the producer Current Value (2021) creates a lead bass in Xfer Serum by manipulating wavetables and Low-Frequency oscillators (LFOs) before adding 'crunch' with a multiband distortion unit. These processes generate subtle distorted elements before introducing another dedicated distortion unit using Serum's built-in effects unit. The 'diode' setting is used for a harsh hard clipping timbre and once the desired effect is achieved, the drive parameter is manipulated to control the magnitude of the distortion. Overall, these multiple processes add a considerable amount of distortion to the final sound and the result is a significantly transformed sound, with an appropriate aggressive sonic character.

In another video, Teddy Killerz (2020) also uses Serum's built-in distortion, this time using the tube setting with 80% drive, on a modulated sine bass before further reshaping the sound with the plugin Trash 2 for higher gain distortion. The resultant

sound is spread over three distorted layers that are controlled as separate channels on the DAW's mixer. In this example, there is considerable resampling (recording the processed audio back into the DAW for subsequent processing), and the resampled audio is then distorted again, resulting in high levels of distortion and a highly aggressive snarling sound. Worth noting is that rather than carefully adjusting a desired set of parameters, the artist scrolls through several presets before settling on one that appears to provide the desired sonic output. The final bass comprises three separate layers: the original sound using built-in Serum distortion, a resampled version with the Trash plugin, and another resampled version, again with Serum's built-in distortion.

Resampling is often used to create multiple variations of the same sound, and in another video, the producer Metrik (2019) resamples and exports a bass riff that was originally recorded with MIDI and processed heavily with distortion and saturation using the in-built distortion in Serum. His approach is to get the sound as overdriven as possible before resampling, allowing for more iterative processing that focuses on modulation, movement and progressive layers of distortion through the resampling process. This is a good example of how the built-in distortion unit facilitates uninterrupted workflow by initially reducing the number of necessary separate plug-ins to establish the core sound while the producer is in a flow state. In many cases, the built-in distortion is used to quickly apply an overarching distortion effect before moving on to dedicated distortion units for more detailed processing, often focusing on specific frequency bands and specific attributes of the sound. This use of multi-layered distortion is much more intricate than the methods of distortion used by pioneers of the style in the mid-1990s and early 2000s. Considering this from the lens of technological determinism, one can posit that this is enabled by the technological trajectory. In the early years of music, the limitations of the technology initiated a path that subsequent advances in technology and, in turn, approaches to music production built upon. Technological momentum created a path where distortion tools became progressively more sophisticated, thereby enabling more complex and intricate methods of distorting sounds.

Ulterior Motive (2014) and Spor (2019) take similar approaches to designing basses in the software synthesiser FM8; they use LFOs for modulation and velocity-sensitive filter modulation before applying FM8's integrated distortion processors. In this video, the processing of the bass is achieved by separating the sub-bass component from the mid-range and top-end components to allow for more control when processing and balancing. The plugin CamelPhat 2 is used for bandpass filtering, and the distortion plugin Saturn by FabFilter adds a subtle hardware-influenced tape saturation before they apply aggressive compression to the overall bass group, imparting an additional layer of subtle distortion (Spor). In the video, Ulterior Motive described Trash 2's "mech" setting as the most destructive distortion option offered by the plugin, one that is capable of crushing or ruining sounds from a technical and purist's perspective. But, importantly, considered under aesthetic theory, the sound is iconic and appropriate for the genre. It adheres to its accepted aesthetic standards, exhibiting a paradoxical beauty despite its objective ugliness. On top of the previous layers of distortion, additional multi-band distortion came from Ohmicide, with each audio frequency band processed with customized

distortion types and intensities. Again, this highlights the contemporary multi-layered approach to applying distortion.

Noisia's (2020) highly influential sound design was deconstructed in a video detailing their collaboration with Mefjus called "Foundations". In the video, they demonstrate their application of Trash 2 to add upper harmonics to a lead stab bass sound; the plugin is configured in multiband mode to apply variations of distortion in each frequency band. (25:28 – 30:11). The complete processing chain involved successive distortion plugins, including Klanghelm SDRR in series after Trash, for a subtle saturation effect applied to the full frequency range. Noisia's experimental approach embraced "happy accidents" by enthusiastically pressing buttons to explore the results of random occurrences and then adjusting the distortion to refine it. Their influential techniques blend intentional harmonic and textural shaping with unplanned sonic mutations from uncontrolled parameter adjustments. It can be argued that modern software plugin design, which allows users to easily return to a previous state or save the results of unforeseen interactions, encourages this type of random, uncontrolled experimentation. Once again, the technology helped establish a trajectory that led to the development of artistic practice and aesthetic possibilities.

Producer Danny Byrd (2021), in a video demonstrating his track "Selecta", uses parallel distortion on a bass sound created in Massive (a simple pair of detuned sawtooth oscillators, often referred to as a Reese bass) where the original distortion comes from the inbuilt Massive FX unit. As this did not provide enough distortion for Byrd, more was added with Decapitator to create 'effects that you can feel rather than hear' and to "add extra bite" presumably focused on the higher mid-range of the frequency spectrum. This distorted signal was blended in as a parallel processed layer in the DAW's mixer. In addition, additional weight was added to the sub-bass from Byrd's use of the plugin True Iron, which applies transformed-based distortion that is focused on saturating the low end of the frequency spectrum (3:15 – 8:15). Byrd's approach exemplified the strategic approach to distortion that targets specific perceptual attributes and frequency ranges rather than general broadband distortion.

In a video with Monroe (2021), he also demonstrated parallel distortion processing, constructing bass tones via Ableton Live's parallel effect racks, that allow the producer to quickly create multiple parallel paths of an audio signal for processing and sound design.

One version in this set-up is heavily distorted, "accentuating the harmonics" which is done by using the overdrive effect in Ableton's effect rack. The other is a "heavily distorted and gnarly" version of the sound created with Cyanide waveshape plug-in with the sub frequencies filtered to focus the distortion on the mid-range; PSP vintage warmer is then used on the bus, adding a general overall saturation to the sound that "thickens out the bass". Monroe's use of Ableton's effect is another example of how the affordances of technology reshape creative practices. It enables new production workflows and sonic possibilities that were not as accessible in previous eras of music production. The affordances "locked in" by modern DAWs have further carved out artistic paths where intricate distortion work is commonplace and an intrinsic part of the genre's sonic signature.

This discussion shows how technology has afforded producers even more creative and intricate ways to apply distortion. Additionally, despite their expertise,

producers often employ presets and randomization to serendipitously discover distorted sonic signatures that might not have otherwise been unearthed.

## Leads

The distortion used on lead sounds was more subtle than the aggressive distortion applied to the bass. In the case of leads, distortion is used to alter the timbre of the sound source rather than for overt explicit distortion. For example, in one tutorial, the producer Wilkinson (2018) incorporated analogue equipment and instruments to achieve sonically complex and rich timbres consisting of subtle distorted attributes. They utilize Camel Crusher as their distortion tool, selecting the mechanical and tube settings for differing shades of subtle distortion, which is then applied to a recorded electric guitar and integrated into the production as a lead sound. The affordances of this plugin, with its various distortion styles, encourage producers to explore a range of distortion tones and refine the results to fit a particular production aesthetic. To further enhance the texture and width of the sound, reverb is introduced, filling the frequency spectrum and enhancing the stereo image of the resulting fuzzy texture. This additional processing helps to soften some of the effects of the distortion, which contrasts with the heavy-handed approach used for bass sounds.

In another video presentation, Matrix and Futurebound (2019) employ similar techniques by embellishing a lead sound, created in the software synth Sylenth, with subtle distortion from Sound Toys' Decapitator plugin. The producers adjust Decapitator for a gentle saturation effect that adds textural fullness in the mid-range and top-end presence, effectively increasing the perception of bite in the sound. This approach of distorting lead sounds to a much lesser extent than the bass is interesting and can, in fact, be considered the opposite approach of what might happen in metal music, where lead sounds are commonly the most distorted sounds in a production. Again, we see a contrasting approach, showing how the use of distortion is not just a technical decision but an aesthetic choice, often constructed by the genre.

## Bus Processing

As with the leads, the use of distortion on buses was characterised by a subtle and nuanced approach. For example, Matrix and Futurebound's drum bus is treated with subtle distortion from the plugin Saturn by Fabfilter. Despite the plugin offering a wide range of distortion, they opt for a gentle approach on the drum bus.

Similarly, in a video with Mefjus (2020), he employs light distortion on grouped basses, adding an "attitude" to enhance their cohesiveness in the mix (21:10 - 24:26). Reso (2014), known for complex breakbeats, takes an experimental approach, saturating the drum bus with PSP Vintage Warmer, a tape saturation emulator and in particular, he uses the FAT mode to create an analogue-like effect.

This subtle use of distortion on buses reflects a mindful approach to shaping distorted sonic signatures in a drum and bass production. The careful application of distortion on buses demonstrates the balance between artistic expression and technological affordances in modern music production. Once again, this illustrates

how technological determinism shapes the decision-making process; the options offered by the plugins, particularly the range and scope of the available distortion parameters, influence the creative process.

## Individual Drums

The videos showed producers applying distortion across various drum elements, and their approach was both subtle and extreme. Heist (2019), for example, was shown saturating cymbals to increase perceived loudness and colouration while also utilizing Cubase's tube saturation for textural thickening of various percussive elements. This multi-instrument distortion approach shapes the drum mix by modifying specific elements, creating a sense of cohesion to the overall drum sound (12:52 – 22:35).

In a video with Joe Ford (2020), he is shown to use multiple layers of samples when creating a snare drum, which he then supplements with white noise. Ford then applies distortion from the Trash plugin with the “faulty transistor” preset to create what he calls “crunchy tops”. A sine wave oscillator is also layered on top of this sound and distorted with Trash to generate additional lower-order harmonics. Here again, we see this intricate approach to distortion with producers sculpting the process to impact specific frequency ranges and sonic attributes. Ford applies the layering approach again when it comes to kick drums, which he creates by combining kick and hi-hat samples before processing them through Trash 2. In this piece of sound design, he employs multiple instances of Trash in the signal path, following the sequence Trash distortion > EQ > Trash distortion. While experimenting with different settings, Ford aims to achieve a specific sound he calls “that saw wave crunch”, presumably referring to distortion that consists of both odd and even order harmonics.

Ford’s approach is an example of series distortion, and the ability to utilize series distortion in contemporary music production is a testament to the impact of technological determinism. As digital plugins and more powerful computers continue to advance, producers now have a wealth of creative possibilities, and this evolution has allowed for the refinement and expansion of distortion techniques beyond what was possible in the past.

## Discussion: Content Creators

This section focuses on content creators to gain insight into their intentions and approaches to distortion. Additionally, this analysis allows us to compare their discussions with the insights gleaned from the professionals discussed in the previous chapter, providing a comprehensive overview of distortion practices across different perspectives in the drum and bass community.

## Bass

Many content creator tutorials focus on using distortion as a crucial element in bass processing. This emphasis is not surprising, given that aspiring producers are often drawn to exploring bass distortion techniques to develop their signature sound and create productions that align with the specific aesthetics of sub-genres like neurofunk. In fact, these tutorials often go beyond simply demonstrating how to

apply distortion; they emphasise the necessity of distortion as a key ingredient in the genre's sonic signature and emphasise that it is perhaps *the* most important element to get right.

There is a noticeable trend in these tutorials of reconstructing sounds previously created by professional producers in their iconic records. Perhaps this is unsurprising, as the content creators may consider it a way to drive up view counts for their videos. However, it can be argued that this reconstruction stifles creativity, forcing both the content creators and their viewers to invest time in replicating sounds made, sometimes, decades ago. Conversely, this practice can be viewed as a way to embrace the heritage of drum and bass and is an important learning experience for modern producers. For instance, in a video with Sceptre Music (2021) he employs Vitals' built-in distortion on a bass part and subsequently resamples and plays it back using a software sampler to emulate the character of hardware samplers from the 1990s (7:53 – 9:44). DnB Academy's (2021) tutorial on Serum showcases a simple bass being processed with Serum FX's built-in distortion, followed by filtering and resampling, aiming to replicate the distinct textures of iconic bass sounds that were distorted with a hardware device and then resampled using an Akai sampler. Likewise, ARTFX (2021) transforms a Vital sine wave bass into a square wave using Ableton's soft clipping distortion, resulting in enriched mid-range harmonics that recreate the retro-sounding aesthetics of early drum and bass productions.

Sounds Good's (2022) tutorial on using the software synthesiser Vital to design a bass sound focuses on the gritty and aggressive sound design commonly found in neurofunk drum and bass. The tutorial concentrates on soft clipping distortion, built into Vital, to add textural grit to a Reese bass, an iconic bass sound used in many productions; its most famous early use can be heard in Ray Keith's Terrorist from 1994. Similarly, Alckemy (2022) explores the sound design of Reese basses, and the approach involves using custom-drawn wavetables in Vital, coupled with resonant notch filtering and heavy distortion, creating an intense timbre with a raspy mid-range texture that aligns with current Neurofunk bass production techniques (4:15 – 18:48).

Early productions featuring the Reese bass presented it in a form that was typically free from distortion. However, as producers began integrating distortion devices into their production process, particularly from guitar pedals and clipped mixing desks, the distorted Reese became commonplace in the mid-1990s. Over the years, this bass has remained a foundation of drum and bass production, with most advances in its sound driven by the evolution of both hardware and digital distortion devices. The development of software distortion plugins has afforded producers much more granular control over distortion-based sound design, and the approaches showcased in these tutorials highlight the artistic and aesthetic possibilities enabled by these technological developments.

## Leads

Regarding Lead sounds, again, there was a tendency with content creators to distort sounds more subtly than the bass. For example, Sceptre Music (2021) demonstrates using Vitals' built-in distortion unit to implement soft clipping. Despite considerable

gain, the soft clipping approach produces a much less aggressive sound than the hard clipping and multiple layers approach applied to bass sounds. Post-distortion processing, including chorus modulation and low-cut filtering, further shapes the distorted timbres to soften any harsh byproducts of the distortion process.

## Drum Groups

Tutorials involving drum sounds revealed similar results to the professional videos. However, there were instances of more creative use of distortion. One video by Youtuber Stranjah (2020) centres around processing the iconic Amen break using Trash 2, which is again chosen for its complexity and range of distortion options. The application of filters and a multiband compressor unit shapes the distortion and removes higher frequencies, particularly from hats. The multi-band functionality of Trash allows for customized distortion that focuses on specific areas of the frequency spectrum. Stranjah experiments with the distortion to balance intensity across bands, resulting in a more intense and aggressive breakbeat (5:29 – 10:31). Similarly, Future Music demonstrates a creative approach to distortion by employing the plugin Saturn by FabFilter to distort the high frequencies of percussive elements. Utilizing the bass as a sidechain trigger, the technique selectively introduces distortion to hats and high-frequency orientated percussion to tightly integrate the elements and provide dynamic control over the distortion.

## Conclusion

This study sheds light on the ubiquitous use of distortion techniques in contemporary drum and bass music production. Producers commonly leverage built-in effects within software synthesizers to achieve subtle distortion effects during initial sound design, and these modern synthesizers, with sophisticated processing capabilities, have made distortion application more efficient and seamless. On the other hand, when pursuing complex or experimental approaches, dedicated distortion plugins like Trash 2 or Saturn are preferred for their versatility, offering multiband processing, diverse distortion algorithms, and inspiring preset libraries. These plugins empower producers to explore more aggressive hard-clipping effects and spark new sonic ideas.

Bass sounds, being a defining feature of drum and bass, receive particular attention when it comes to distortion. The genre's aesthetic, deeply rooted in the mid-1990s tech step movement, demands aggressive bass distortion techniques to achieve its characteristic intensity and impact. In contrast, for lead sounds and buses, producers apply distortion in a more subtle and gentle manner, focusing on adding harmonics and texture for subtle timbral changes and cohesion rather than outright driving distortion.

Interestingly, this study also reveals a trend of reconstruction within the output of content creators. Many of these educational videos aim to recreate professional producers' iconic sounds and techniques, reconstructing the seminal sonic signatures found in commercial drum and bass releases. While this approach allows aspiring producers to learn and experiment with established techniques, it also has the potential to stifle creativity by encouraging replication over innovation.



As applied to this study, the idea of affordances has helped explain how specific types of distortion devices, particularly modern software plugins, have encouraged specific distortion techniques, thereby helping shape the aesthetic of drum and bass. This also aligns with technological determinism, which suggests that new technology's capabilities significantly impact creative practices. As shown in this study, the advancement of digital technology via ever-increasing computing power and feature-rich digital plugins has afforded producers sophisticated and intricate methods of applying distortion.

Finally, it is worth considering that drum and bass music was a genre that historically challenged the norms of clean and precise sound aesthetics, particularly in 1980s and early 1990s pop music productions. In its early days, drum and bass deliberately embraced distortion as a defining feature, breaking away from the conventions of polished productions. But this once underground and rebellious approach to distortion has become widely accepted and incorporated even in mainstream pop music. The once unconventional has now become the norm, illustrating the transformative power of distortion in reshaping music production aesthetics.

This shift towards embracing distortion aligns with Adorno's perspective on artistic experimentation, arguing that true artistic innovation arises from freedom and independence from commercial constraints. In the context of distortion in drum and bass, the genre's early adoption of distortion represented a form of resistance against the established norms of the music industry, but as distortion became more commonplace and widely accepted, it also became integrated into commercial music production, including mainstream pop. This is particularly significant as, although distortion can be viewed as a technical imperfection--the ugly sound of equipment 'going wrong' and stressed outside of its optimum working conditions--it is an essential sonic attribute of contemporary music production, embodying the paradoxical beauty that has come to define drum and bass music.

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