The Cyclical, Reciprocal Relationship Between Funk Drumming and the Hip-Hop Technologist

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Description of Digital Assets:

The digital assets associated with this thesis can be accessed in a number of ways. For those readers with Spotify or Apple Music accounts, the *Analogous to Analog* and *Hybridizatio*n recordings are available there at the following links:

Spotify: https://open.spotify.com/artist/1i5bFQElRsGXhyri0XHzmF?si=EHrXowJhSQ-5Adaas7G5lA

Apple Music: https://music.apple.com/us/artist/resonant-objects/1527173517

For readers without access to paid music streaming services, all digital assets may be accessed online at this permanent Google Drive location:

Google Drive: https://drive.google.com/drive/folders/1bCWcgixivVa17ve_9rr_Ehc34Gobi1kL?usp=sharing

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(I1.) Cut Chemist (DJ)

(I2.) Monyea Crawford (Producer)

(I3.) Adam Deitch (Drummer)

(I4.) Kerry Denton (Drummer)

(I5.) DJ Faust (Turntablist/Producer)

(I6.) Yusuke “HAMACIDE” Hama (Producer)

(I7.) Maté Jancsovics (Drummer)

(I8.) Daru Jones (Drummer)

(I9.) Tom Knight (Drummer)

(I10.) Trevor Lawrence Jr. (Drummer)

(I11.) Allison Miller (Drummer)

(I12.) Stanton Moore (Drummer, Author, Educator)

(I13.) Ydna Murd “Andreas David” (Drummer)

(I14.) Ryan Noise (DJ/Producer)

(I15.) Jim Payne (Drummer/Author)

(I16.) Jan Pfennig (Drummer, Author)

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Acknowledgements:

First and foremost, I must thank my wife and family for their support and encouragement in completing this academic endeavor. Their patience and understanding in regard to the amount of time I have spent away from family gatherings or in falling short of family expectations and responsibilities is appreciated b my ability to fully express.

I would also like to express my sincere gratitude to Robert Maybery and Derek Carvotta without whose assistance, time, efforts, and talents, none of my practiced-based output would be possible. Robert opened up his home and studio to me nearly every weekend for two and a half years in support of the recordings *Analogous to Analog* and *Hybridization*. In addition, we spent countless hours together editing audio samples, experimenting with recording techniques, and philosophizing about all things recording and producing audio.

Derek Carvotta supplied all the guitar performances on both the *Analogous…* and *Hybridization* recordings. In truth, I believe his performances could have easily been the focus of a PhD or DMA in and of themselves as they are integral to the sonic description of the intended genres presented on both recordings. Derek's ability to find what are, in my opinion, the most appropriate guitar tones and melodic/rhythmic guitar parts, speaks directly to the mastery of his craft.

I too must thank and acknowledge Ryan Noise for his contributions. All the music included on *Analogous to Analog* and *Hybridization* began as snippets of audio created and produced by Ryan Noise. Ryan was most generous and accommodating with his time and creativity as we worked together to create the appropriate source materials that I would later take back to the studio and musicians to develop into the 24 tracks that comprise *Analogous to Analog* and *Hybridization.*

I must also thank Drs. Brendan Williams and Nicola Spelman, my direct supervisors in this academic endeavor. Their contributions are countless, and I will never be able to truly convey my depth of gratitude and appreciation for their time, effort, and patience. Both of these fine people have been under tremendous pressure during this time of COVID within their own academic employment and yet still were able to make time to provide counsel, guidance, and encouragement. Like the musicians who contributed performances to my recordings, Drs.

Williams' and Spelman's contributions to my work are essential and without them I certainly would have been utterly lost.

Finally, I would like to dedicate this document and all associated output to my late father, Frank Walker, and my mother, Joyce Walker. My parents have always been a source of encouragement and energy when I felt as though I would not be able to continue. I began this DMA experience before my father passed and he was very excited that there would at last be a "doctor" in the family…even if I would not be able to write his prescriptions! (A joke he often made.) Both my parents came from humble beginnings and made much of their lives professionally despite their lack of resources. They both instilled in me a confidence that with enough effort, tenacity, and desire, anything can be accomplished. It is this most valuable lesson that has provided me with the ability to complete this DMA experience. It is my hope that I will honor my parents with the completion of this degree.

Abstract:

This thesis seeks to reveal the cyclical and reciprocal nature of the relationship between live drummers, DJs, and beat producers (hip-hop technologists), illustrating the ways that these artists have continued to inform and inspire one another to evolve while considering various performance and production techniques that affect the sonic characteristics of both live, recorded, and sampled drum performances. It demonstrates how progenitors of funk drumming directly influenced decades of subsequent drummers, DJs, and beat producers across a wide array of genres, specifically hip-hop, pop, and to a lesser extent, sample-based music genres[1].

To date there exists very few scholarly materials that speak to the cyclical and/or reciprocal nature of funk drumming and its influence on or use in hip-hop music creation/performance. It the intent of this document therefor to provide direct correlation between funk drumming and hip-hop music as well as to propose that hip-hop music is in fact a natural evolution of funk drumming. Through interviews with preeminent musicians, musician-scholars, and music producers and DJs–and through my own practice-led research in the creation of two recordings, I am able to bring firsthand, primary source-level information and perspectives to this thesis.

Within the drumming community it is widely understood and taken as granted that funk drumming is the source material from which hip-hop music evolved. The information provided within this document, though not entirely new or revolutionary in its individual components, seeks to provide clear correlations by illustrating the use of, or recontextualization of seminal funk drumming patterns/recordings in hip-hop recordings and by detailing the evolution of funk drumming patterns from the post-bop, R&B, and early rock 'n' roll genres. This thesis also seeks to illustrate how the Afro-Latin clave rhythm is embedded within much of the funk drumming vocabulary by providing examples of its use throughout the evolution of early pop/rock/R&B genres. As such it is my assertion that these correlations have not ever been presented in the way in which this thesis does–nor have the assertions presented within this document ever been formally presented in a peer-reviewed or

[1] The influence of funk drumming and funk-derived music is certainly not limited to hip-hop, rap, or pop music, though the scope of this document must, by necessity, be limited. Funk-influenced drumming can be found in nearly every post-funk genre of music that incorporates drum set performance.

scholarly document. Therefore, it is my assertion that this thesis provides new context and perspective on the relationship(s) between funk drumming and hip-hop music.

Introduction

In this document I generally combine “DJs and Beat Producers” together, though it is important to note that the two are not the same. Further discussion of the distinction occurs later in the thesis. Additionally, this inquiry supports my practice-based research by demonstrating how the vocabulary used by early funk drummers became the bedrock of decades of technologically mediated music to come, continuing up to the point of the creation of this document.

When considering the intent of this thesis, it is practical at this point to describe what is meant by “cyclical” and “reciprocal” within the context of this research endeavor. “Cyclical,” in this document, refers to the experience whereby a live drummer encounters music-related technology (electronic drum set, electronic drum pad, drum triggers, drum machines, audio sampler, DAW) and a response of some type occurs within the live drumming community (see figure 1). As music-related technologies continue to evolve, so do the responses from the live drumming community. These responses manifest themselves in a number of ways among members of the drumming community, such as in the tuning of their instruments, the affecting[2] of their instruments, evolutions in the rhythmic vocabulary employed and the techniques required to manifest this evolved rhythmic vocabulary.

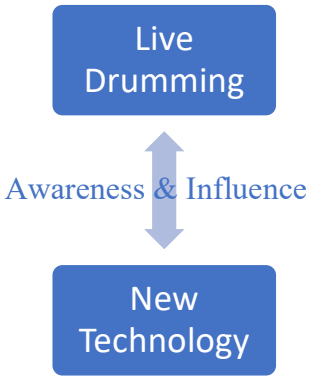

Figure 1. The Cyclical Relationship Between Live Drummer & hip-hop Technologists

[2] Within the context of this thesis, “affecting” refers to the application of objects or materials to the drum set in order to mitigate/effect tone, timbre, or sustain.

The term “reciprocal” will be used within the context of this document to describe the two-way “conversation” that exists between musical technologists (DJs & beat producers) and live drummers (see figure 2). This is not to imply that actual conversations occur (though this is not at all unlikely), but rather that a bi-directional flow of influence and information shared, inferred, or acquired via listening experiences occurs between music technologists and live drummers. When DJs and/or beat producers create new patterns via their preferred methods of creation (turntables and mixer, drum machines, samplers, DAW), the drumming output is oftentimes a stylized recreation of drumming that was originally performed by a live drummer or multiple drummers/percussionists. The influence of the live drummer’s playing may be conscious or otherwise to the hip-hop technologist, regardless the live drummer’s performance(s) and sonic aesthetic are forever embedded within the reconstituted drum track(s). These new and stylized interpretations (often comprised of multiple, disparate performances) are unique enough to stand apart due to the sound palate employed and/or the rhythmic parts composed. Drummers then hear and respond to these innovations by affecting their instruments and or performance in some meaningful way in order to emulate their interpretation of these influences. In this way, a back-and-forth flow of information and influence is created.

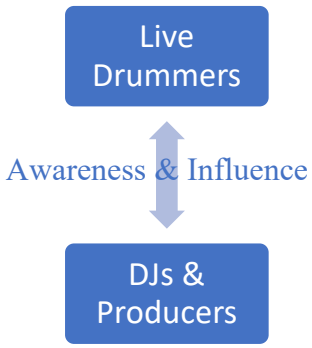

Figure 2. The Reciprocal Relationship Between Live Drummers and hip-hop Technologists

To accomplish this endeavor, I have analyzed and notated drumming patterns used in seminal funk recordings as a point of departure. To determine which recorded patterns might be considered seminal, I have considered the number of times the pattern has been sampled or used in other contexts and/or its popularity as denoted by its Billboard charting. Although it would be impossible to know every instance of a specific drum pattern’s performance, there

are data platforms, such as WhoSampled.com that shed light on substantial uses of sampled drumbeats over time.

Next, I have chronologically tracked how these iconic patterns have been sampled or simply replicated by other drummers. There is no way of determining how many times a given drum pattern may have been used across time and genre, as this type of data is not measured or recorded. Furthermore, given the slight variations of the patterns that inevitably occur, cataloging the patterns has been accomplished with measured skepticism; it is important to note that this cannot be an exhaustive survey, but rather focuses on recorded performances that have proven to be significant waypoints[3] or pivotal over time. Again, as there is no database of recorded drum patterns used across time and genre, we are left determining instances of use based on the available research, anecdotal information, and personal listening experiences. The goal of this investigation is to show definitive correlation with, if not exact duplication of, the original funk drumming patterns as they are used across decades and a wide variety of developing genres. Having documented the rhythmic vocabulary and its recontextualization, the primary aim of this thesis can then be illustrated: the relationship between drummers and DJs and beat producers is not one-sided or mono-directional, but rather cyclical and reciprocal.

Since the late 1970s when turntablism emerged as a unique performance art, funk records provided much of the source material that DJs used to create a recombinant collage of music. Specifically, there exists an occurrence in funk music known as the "the break" wherein, conventionally, the drummer is left to play solo for some amount of time, generally four to 16 bars, and this is known as the "breakbeat." DJs will find the breakbeat within the context of a recorded performance and then play it "on loop" by utilizing two turntables playing the same (or not) breakbeat but staggering the start of each in such a way as to have them appear to last indefinitely – perhaps playing offset and concurrently or in sequence. Furthermore, a DJ's manipulation of these recorded sounds by mixing, beat matching, layering, and scratching (by means of turntables and mixers) creates new and exciting textural and non-idiomatic rhythmic ideas for drummers - and thus the cycle of drummers influencing DJs/beat

[3] "Waypoint" is used here to describe watershed moments in the evolution of drumming patterns.

producers influencing drummers is initiated[4]. To further add weight to the assertions presented, information gathered from interviews with current performing artists and practitioners is included within this document. This data, in the form of first-person accounts, will serve to augment the scarce academic/peer-reviewed writing available in this particular area of study.

This thesis engages with contemporary practice by investigating and then creating new music informed and inspired by historical and contemporary hip-hop(-influenced) music. With the advent of the drum machine and in particular DAW-based drum production, the rhythmic possibilities available to beat producers is limited only to the producer's imagination and skill with the technology at hand. As such, new and oftentimes unconventional, non-idiomatic rhythms are performed together in a way that is incredibly difficult, if not impossible, to recreate by a single live drummer. Additionally, the overwhelming number of percussion and drum sounds available to the producer immediately dwarfs the number of sounds that any drummer could conceivably carry to a performance. This phenomenon of the live drummer trying to recreate not only the vocabulary but also the timbres and nuances of beat producers has pushed the state of the art in drum set performance to heretofore unseen heights of dexterity and creativity. This thesis concludes by highlighting several such instances.

Finally, because the scope of a research endeavor such as this must have limitations, discussions about prepared instruments and their use within the classical art music context will not be included. This is not to suggest that there are not similarities to some degree, but rather that the impetus for the preparation of instruments may not be the same in the art music genres compared with those of drummers working in the hip-hop-influenced genres. Whereas art music composers who require the preparation of percussion instruments might do so in an effort to stylize the sound of an instrument for any given reason, the hip-hop influenced drummer's impetus is to emulate sounds found on recorded tracks where the drum sounds are technologically mediated. And to be sure, the practice of preparing drums has a long tradition in the recording studio – most often as a method of mitigating volume, tone, or sustain.

[4] This is certainly not to suggest that tape loops and other mechanical means of producing drum patterns did not already exist, but rather that these modes did not constitute the same amount of influence that came as a result of the DJ and beat producer.

Introduction: Formative Activity

I began to interact with music at an early age while in primary school. While in a music class I was introduced to melody, harmony, and rhythm. I was immediately infatuated with making "music" and began playing anything around the house that would make what was to me an interesting sound. Later, when I began middle school, I elected to take band class in the hopes of playing percussion and was assigned the tuba due to my name being nearly last in the alphabetical call to choose an instrument. And though I strongly protested and tried to convince the director of my previous musical training and experiences in percussion, a tuba player I was to be. I continued to play tuba and other low brass instruments through middle school and high school, though when I reached the eighth grade, I saved enough money to purchase my first set of drums. I immediately formed a band with friends from my neighborhood and we began making what was likely an awful racket in my mom's living room while she was at work.

I began taking lessons when I could afford them (which was sporadically at best) and taught myself by reading drum magazines and watching MTV incessantly. When I joined the marching drum line in high school, I began to receive consistent training and development in rudimental drumming, and this had a profound effect on my drum set playing. Without access to regular drum set lessons, I began to apply my rudimental drumming exercises to my drum set practice. I began to re-engineer my timing, accent pattern, and rudimental drumming exercise patterns on the drum set to surprisingly beneficial effect. This, in combination with my pattern and logic-oriented mind, gave me a foundation for constructing beats and patterns in a systematic way. I made rhythmic games for myself based on rudimental drumming exercises whereby I would begin to systematically play every 16^{th}-note bass drum, snare drum, hi-hat pattern, or combination thereof within a 4/4 bar of time. This eventually led to experiments in any other meter I could imagine and a considerable amount of coordination and dexterity for a high school-aged student with no formal drum set training.

I was fortunate to attend a high school with an excellent music program that offered concert bands, marching bands, percussion ensemble, jazz band, orchestra, and musical theater opportunities. I took advantage of all of them. I loved to play and as long as I had sticks or mallets in my hands, I was happy to contribute to any ensemble. Additionally, and in reflecting, it was a fortuitous time to be a musician. It seems as though all of my friends and

acquaintances at that time were musicians and forming bands – and I was kept busy playing in bands that played covers, rock 'n' roll, jazz, punk, ska, funk, and a number of other genres that I cannot easily articulate. I did not appreciate it at the time, but these initial musical experiences laid the bedrock of all that would come. After high school, I continued to perform with local bands and competed in nationally-touring groups within the Drum Corps International and Winter Guard International organizations. It was a tremendous time in my development that afforded me many opportunities to grow and develop my skills and musical awareness among some of the best musicians and educators working at that time.

Upon entering college, I declared as a music education major and began courses in percussion and music education. Admittedly, I was not a great student in my initial years in undergraduate studies. While I absolutely loved studying music and taking lessons, I was equally enamored with seeing and playing live music in the clubs in town. I intrinsically understood that being at these live music venues was every bit as educational as sitting through music theory at 8am, though I lacked the maturity to balance those separate educational opportunities effectively. As such my undergraduate studies were protracted well beyond the normal four- or five-year music education pathway. However, the extra time spent in undergraduate studies provided me with more musical experiences than I might otherwise have had if I had been a "good" student.

Not content with the percussion performance training I received as an undergraduate music education student, I returned to college and began an undergraduate music performance degree in percussion, mostly as an excuse to spend more time with my applied percussion teacher John Lawless, and to have access to the university ensembles. I spent an additional two years developing and strengthening my understanding of percussion pedagogy, performance, and playing with any and every student or ensemble that may be in need of a percussionist.

During this time, I was also heavily involved in the local music scene in Atlanta, Ga. I played in every type of band from free jazz to rap/rock. My need to play and my curiosity for meaningful ways to express myself within a variety of musical contexts could not be sated. I also began playing for hire as a studio musician and found that experience to be very interesting and rewarding. Performing within the recording environment felt competitive to me in the way that performing in my earlier competitive ensembles felt. As far as I was

concerned, when the red light of recording went on, I had one opportunity to be excellent, much in the same way that the competitive ensembles I performed with had only one opportunity to perform and win. I was also captivated by the recording process itself. It spoke to my logic/process-oriented mind and I found myself spending more time in the studio simply watching the engineers working and asking them questions, long after I had completed my role as drummer.

My first experience with affecting drum sounds at source (other than the ubiquitous wallet on the snare or duct tape on toms) came in 2000 when I was working with the band Heavy Mojo. Heavy Mojo was a live hip-hop group featuring three MCs and a four-piece band consisting of guitar, bass, keys, and drums. We had been rehearsing and performing for almost a year when we were invited into a recording studio to record a demo. It was at this time that the engineer began to ask me questions about what drum sounds I thought might be most effective in the scope of the demo recording. I was caught completely off-guard – I had always believed those decisions were left to engineers and producers. However, as we began to discuss the intended sound of the band, our influences, and the musical gear and recording technology on hand, it became quite clear that if the drums and cymbals in the drum booth were not affected in some way, the recording would suffer due to the drums sounding too "rock." To that end the engineer and I began to experiment with applying all manner of materials to the drums in order to curtail resonance, modify pitch, and in essence, make the drums sound as acoustically short as possible. Although I thought the process dubious initially, when I heard the recorded sounds played back in the control room, I was astounded to hear them more closely emulate those found on recordings by bands who we found influential.

Years later, after I had spent nearly a decade freelancing as a musician and educator, I once again returned to university to pursue a master's degree in jazz. I had always had an affinity for jazz though my education in the performance of the genre had been largely self-taught or as a result of jazz band experience while in undergraduate studies. I entered the degree program primarily because it was the only degree path that would allow me to play only drum set. During that two-year experience I developed greater understanding of the interconnectedness between jazz, latin, funk, R&B, and hip-hop. Though the correlation was never formally discussed beyond the idea that jazz was the impetus for all urban music styles that would follow, I was fascinated by the seemingly obvious thread of rhythmic connectivity

between jazz, latin, funk, R&B, and hip-hop. Though the rhythmic vocabulary certainly evolved, as would any spoken language, there remained significant traces of the swing element, syncopation, and idiomatic rhythms. It was at this time that I began to consider the back-and-forth, cyclical, and reciprocal nature of drumming patterns found in funk drumming and hip-hop.

After graduate school, I continued to freelance and took supply positions as a high school band director for five years before I began to teach at the university level. Since beginning my post as Director of Percussion Studies at the University of North Georgia, I have had the fortunate opportunity to work alongside some incredibly brilliant and gifted scholars and musicians. Their scholarship and output are the inspiration for this DMA endeavor. It is with their encouragement that I decided to investigate this idea of the cyclical and reciprocal relationship between the live drummer and DJ/beat producer/technologist. And, as a result, I have been able to not only identify the clear connections that I believed would be there, but also to complete two full-length studio recordings in defense of this thesis.

Though my path though academia has been long and most certainly winding, in hindsight, I do not believe I would do it again any other way if given the chance. I firmly believe we are all the sum of our experiences and the knowledge gained from those experiences. Had I taken a more direct route through academia, I most likely would have foregone many of the substantive experiences have made me the effective educator and musician that I am today.

Introduction: Research Focus

First and foremost, it is important to note that this document will not broach in any significant depth the social, cultural, or political realms of the funk, hip-hop, rap, or EDM genres. Nor will it try to further elucidate the history of jazz, rhythm and blues (R&B), rock 'n' roll, hip-hop/rap, or EDM styles. There are many excellent scholarly materials on these topics already. Persons interested in these topics might be interested in the works of Tricia Rose (1994, 2008), Nelson George (1998), Eric Reese (2017), Mark Katz (2010, 2012, 2019), Joseph Schloss (2014), André Sirois (2016), or Jeff Chang (2007, 2008, 2014), but to name a few.

Instead, this document focuses on describing, illustrating, and commenting on the correlation between what is already known and accepted about funk drumming and how it ultimately became source material for a new genre, hip-hop. The thesis proceeds to describe and illustrate the ways in which drummers who play funk patterns and hip-hop DJs/beat producers have continued to inform and influence one another over time. Finally, the thesis endeavors to shed light on the way in which drummers are currently trying to replicate/emulate the sonic palate employed by many hip-hop technologists by augmenting their acoustic instruments or employing extended performance techniques. And, though admittedly more difficult to prove in any definitive way, this document also endeavors to draw a correlation between the creative output of post-technology influenced drummers[5] and beatmakers and identify how the post-technology drummers have influenced the creative output of beatmakers.

Current Evidence

In support of this document, two original full-length studio recordings (40 minutes +) and a third live recording of the culminating lecture-recital are provided. These recordings illustrate the ways in which funk drumming patterns can be utilized and/or recontextualized in a hip-hop, pop, or contemporary music context. The studio recordings serve as further evidence by way of their production techniques and performance. The lecture-recital recording ultimately demonstrates the ways in which the sound of the drum set can be augmented and/or

[5] "Post-technology influenced drummer" is used to describe drummers who perform/create in a time after the advent of DJs, turntablism, sampler technology, and DAW software music creation.

manipulated in real-time and in a live context without any studio production techniques having been applied.

The first of the two studio recordings, *Analogous to Analog* contains 12 tracks (43 minutes) and seeks to illustrate the ways in which funk drumming patterns have been employed historically and/or have evolved over time. The tracks span a wide range of funk sub-genres including psychedelic, (San Francisco) Bay Area, funk-rock, jazz-funk, pop-funk, among others. Admittedly, these sub-genres are often difficult to quantify and/or qualify and oftentimes the sub-genres overlap, further obscuring the intended sub-genre. Hopefully, what is clear to the listener is the way in which the funk drumming pattern has been utilized. Additionally, the listener will note the minimal amounts of effects applied to the drum production on this record. This is done to further contextualize the sound of the drums relative to the time period from which the source drumming vocabulary was sampled.

The second of the two studio recordings, *Hybridization,* contains 12 tracks (42 minutes) that are intended to provide a context for funk drumming patterns within the broadest idea of the hip-hop genre. Within this collection of tracks there are examples of several sub-genres of hip-hop that include trip-hop, jazz-hop, G-Funk, East Coast, West Coast, and Trap. Again, it can be difficult to accurately determine the sub-genre of any of these tracks and the author will ultimately leave it to the listener to make their own sub-genre determinations. What the listener will undoubtedly hear is the overt level of affectation of the drum sound applied in post-production. Although the drums were affected at source during this (and all) recording, to effectively place the drums within the contemporary hip-hop production aesthetic, additional processing was deemed necessary[6].

The Lecture/Recital recording contains 8 tracks of live performances selected from the two studio recordings. The intended goal of the Lecture/Recital was to present tracks that are selected to generally describe the evolution of funk drumming in a quasi-chronological manner. However, due to the Covid-19 social distancing restrictions in place at the time of the recital, only two additional musicians were permitted on stage with me during the Lecture/Recital. As such, the number of tracks that could be effectively performed (even with

[6] A complete description of the recording and production process is detailed in Section 7.

the use of pre-recorded materials) was significantly limited. The Lecture/Recital is discussed in greater detail in Section 8.

The Lecture/Recital recording is intended to present the studio-recorded performances in a way that would allow the audience to witness the real-time application of materials to drums and cymbals in order to facilitate sounds affected at source for the purposes of trying to emulate drum sounds that have be affected during production processes. Additionally, the live performance will demonstrate the use of funk drumming vocabulary in both traditional and recontextualized instances. However, due to Covid-19 restrictions at the time of recording, there were many tracks that could not be performed as intended. As such, the tracks that were performed were those that could be performed effectively within the context of a guitar, bass, and drum trio with supporting tracks provided via Ableton Live.

Additionally, an appendix containing over 100 examples of funk drumming patterns that have been sampled into hip-hop recordings has been compiled as evidence of funk drumming's undeniable influence on hip-hop. This list is in no way exhaustive, though is serves to illustrate how funk drumming patterns from 1962 to 1981 have been employed. At present, it appears that this is the only compilation of its kind to exist insofar as its scope is limited only to recontextualizations of funk drumming.

Research Methodology

The research methodologies adopted in this DMA are the following:

- Inductive/Qualitative - Interviews with drum set artists, DJs and beat producers, and music producers
- Practice-led - Creating/arranging original musical material illustrating funk drumming's use in the hip-hop/pop genre
- Quantitative - Analyzing and codifying funk drumming patterns and identifying them in recontextualized contexts

In the creation of this document three research methodologies were employed: inductive/qualitative, practice-led, and quantitative. The inductive portion of the research is centered around the observation of ever more drummers affecting their acoustic instruments and/or developing advanced techniques or non-traditional ways of playing their acoustic instruments and hypothesizing that this phenomenon may be a result of advances in rhythmic vocabulary led by advances in drum programming via music-related technologies, and/or tonal shifts in drum sounds via recording and production techniques. In order to validate the hypothesis many interviews were conducted and pertinent data was mined from those interviews.

Additionally, my own practice-led research provided useful insights into the manner in which the live drummer is affecting their acoustic instruments via the application of materials to the drums and cymbals, by preparing the instruments in a non-standard fashion, and/or developing and using advanced or non-traditional techniques so as to make sounds more similar to those produced by drum machines, samplers, or DAWs. Through the writing and rehearsing of the 24 tracks that comprise *Analogous to Analog* and *Hybridization*, I was able to explore a wide variety of materials that might be applied to acoustic drums or cymbals as well as non-traditional techniques of performance.

In order to better understand the evolution of funk drumming and its role as progenitor in hip-hop, I cataloged and traced the use of more than 100 funk drumming performances and their recontextualization in hip-hip. Additionally, a number of historical examples are notated within the thesis and commentary is provided for context. An effort has been made to suggest that the clave rhythms are the source material for many of the funk drumming patterns. To

this end, funk drumming examples have been provided along with anecdotal evidence which corroborates this assertion. It is this part of the thesis that comprises the qualitative portions of the research.

There exists an obvious lack of peer-reviewed and scholarly resources specifically related to this thesis. Those that have been located are generally only tangentially related to the topic at hand and the scholarly materials that do exist are generally in the form of articles, postgraduate theses, or chapters within compilations, though there is the occasional book that offers a few relevant insights. For instance, and to name but a few, those interested should seek out works by: Alexander Stewart (2000), Jeff Greenwald (2002), Nello Biasini (2016), Rowan Oliver (2015), Simon D. Bottom (2005), Michael D'Errico (2011) Oscar Bettison (2009), and Robert Davis (2005). These sources are exceedingly rare and when found generally contain only very short passages of information that would be considered germane to the research. There is, however, no shortage of non-scholarly, non-peer-reviewed materials across the internet and in drum and music trade magazines. This clearly presents a challenge in determining the veracity of an author's work.

To find the specific and relevant data required for this document, many interviews were had with notable artists that have worked or are currently working as a drummer, producer, DJ, author, or in some cases all of the above simultaneously. In determining who might make a suitable candidate for interview, each artist's body of work, style and influences, relationship to music technologies, and willingness/ability to be contacted was considered. Due to COVID-19 safety protocols and many live performances having been canceled, many artists were not working and thusly available for interview.

Prior to the interview a list of questions relevant to a drummer's, DJ's, or producer's experience was created, essentially a script that was attempted per interview[7]. However, most interviews devolved into open-ended conversations guided by the pre-arranged script resulting in no two interviews being the same. However, each interview did cover the same essential questions with respect to musical influences, training and development, experience

[7] See Appendix 3 for a list of questions asked of drummers and DJ/beatmakers.

with and influence of music-related technologies, and thoughts about the evolution of funk drumming in reference to its influence on hip-hop music.

Most interviews were conducted via the internet video-call platform, Zoom–though a few took place via Apple FaceTime. All interviews were recorded either in Zoom's cloud storage or locally on the computer in which the FaceTime call was held. After the recordings were rendered into a smaller, more manageable file format they were uploaded to Amazon Transcribe so that a text document could be generated from each recording. Though very useful and time-saving in general, AI-based transcription services like the one used in the preparation of this document are still not effective at interpreting casual speech between two people–particularly when the use of jargon and slang are so prevalent. As such, a great amount of time was taken to edit transcriptions for clarity and accuracy and then to data mine each interview for relevant data. Through the collating and correlation of interview-driven data, macro-level observations/deductions were made.

Related Literature

There are many excellent resources that would inform a researcher or drummer interested in learning the vocabulary of funk drumming, and some of these drum tutorial texts do present the material in some version of chronological order. These texts are written by artist-scholars whose altruistic desire to share their experience and knowledge has provided the drumming community with an invaluable resource in their efforts to document funk drumming vocabulary. Some of these texts are quite robust and detailed in their funk drumming transcriptions and in their commentary about the vocabulary. However, what is absent is any acknowledgment or description of the evolution of live funk drumming and its integration into hip-hop. To be sure, there are instances in some of these texts where hip-hop drumbeats are notated and discussed to an extent, but again, no discussion or very little discussion is given to the connection between funk drumming and hip-hop. It would appear that this connection is completely taken for granted and/or generally understood to be obvious.

Jim Payne's *Give the Drummer Some!* (2016) comprises 276 pages of funk drumming transcriptions and biographies of prominent funk drummers. Though broadly informative and well organized, the text does not include any information on the correlation between funk drumming and its integration by hip-hop. The bulk of the information is chronologically

biographical, beginning with drummer Earl Palmer (Fats Domino, Little Richard, The Righteous Brothers), and works its way through the drummers of James Brown and then a selection of "Masters of Funk And Soul," concluding with David Garibaldi and Mike Clark. The 38 pages of funk drumming transcriptions are divided into six distinct sections. The first details examples of patterns utilized by James Brown's drummers. This is followed by sections dedicated to classic "R&B/Soul," George Brown of Kool & The Gang, James Williams of the Ohio Players, David Garibaldi of Tower of Power, and finally Mike Clark. This book is an excellent source for anecdotal and biographical information on drummers of note from the early days of funk drumming and, to a lesser extent, the vocabulary they employed.

The co-authored text *Early Rhythm And Blues Drumming* (2008), by Zoro and Daniel Glass, is another example of a drum tutorial that combines anecdotal, historical, and biographical information along with some transcriptions and primer information on how to approach these historical styles authentically. Although the book's byline is "*A Guided Tour Through the Musical Era That Birthed Rock 'n' Roll, Soul, Funk, and hip-hop,"* it does not include any information on the correlation between funk and hip-hop. Again, it would seem as though the evolution of funk drumming vocabulary and its subsequent integration by hip-hop is taken as granted.

Mike Adamo's text, *The Breakbeat Bible* (2010), is a veritable catalog of breakbeat patterns delivered in a logical and methodical manner. The text also includes minimal anecdotal and biographical information and will on occasion highlight a drumming pattern with historical context. While this text provides an impressive amount of information on the construction and application of breakbeats, it does not specifically address the way in which funk drumming *became* breakbeat. The text does however offer information on how to mitigate the tone and timbre of a drum set to make it sound more in line with the hip-hop aesthetic.

Zoro's text *The Commandments of R&B Drumming* (2007) is yet another example of a drum tutorial that provides historical, anecdotal, and biographical information concerning several prominent funk drummers as well as primer information on performing these styles in a historically authentic manner. This text primarily provides step-by-step information on how to recreate the drumming vocabulary employed in the eras from gospel and soul, to and through hip-hop. To a lesser extent, it provides historical and biographical context and

transcriptions of notable funk and/or hip-hop drumming patterns in the *Go Go*, *New Jack Swing*, *Slow Hip-hop*, and *House* styles.

To be clear, there is absolutely no shortage of drum texts that will provide the reader with a nearly unlimited supply of funk drumming patterns to explore. And there are almost as many books dedicated to the patterns employed within the hip-hop genres and subgenres. However, these texts do not generally provide any historical context for the delivery of this information. Furthermore, they do not address the overlap or correlation between the funk and hip-hop drumming vocabulary.

Additionally, there are drum tutorials available on DVD media. These tutorials are generally presented within the framework of a lecture/recital or panel discussion and generally contain a small amount of material in print or PDF along with the DVD. These print materials usually take the form of primer materials designed to give the consumer a physical copy of material presented within the DVD performance. See, for example, Steve Smith's DVD, *Drumset Technique – History of the U.S. Beat* (2002).

To this end, the bulk of the information contained in this document is a result of my own time, prior performing and recording experiences, artist interviews, researching relevant materials (scholarly or otherwise), and producing the recorded materials that support my hypothesis. I also present examples of recorded material for the reader to consider. My own conclusions about these recorded examples are presented as evidence in support of this thesis, the idea being that when historical and more current recordings are sampled one after the other, they serve to demonstrate the cyclical and reciprocal relationships between funk drummers and DJs/beat producers.

Practice-led Research

During the process of research, it has become obvious that there are a wide variety of recording and production techniques that have been employed during the period that is the scope of this project (ca. 1955 - present). As such, capturing my own drum performances in a way that is sonically appropriate for the tracks that will serve as my evidence has proven challenging, because it is not always clear which aesthetic the drum performances should encompass: the historical aesthetic or the contemporary, technologically mediated aesthetic.

Initially it seemed prudent to try and recreate the early sound of these recordings, as the early funk drumming recordings have served as source material for so many early hip-hop recordings. Numerous early funk drumming recordings (late 1950s to early 1960s) were often recorded live, in ensemble with a live band in a single room, under a minimal number of microphones – generally one overhead, one on the snare drum, and one on the bass drum.[8]

However, when DJs or beat producers would sample an early recording of funk drumming, they would oftentimes re-contextualize the sound, thereby updating it for their particular idiom and the sonic landscape in which they were creating. It is common practice to drastically EQ a drum sample to bring out the low-end frequencies not necessarily evident in the original recording, and/or to layer additional drum samples over the original drumming pattern (either exactly or otherwise) to create a much more texturally complex and sonically arresting drum sound. This process, although likely just an aesthetic affectation employed to create a sound concurrent with sonic trends in the late 1970s and early 1980s, had the distinct result of becoming recombinant music[9], creating the "collage" effect that is ubiquitous to hip-hop. As Jeff Greenwald (2002, pg. 267) makes clear:

> *The facility with which a producer or artist can use a drum machine provides a plethora of sounds that can be combined to create a desired sonority. Just as rappers can change their vocal meanings, and just as a rock guitarist can use different electronic effects to convey different meanings, the multiplicity of sounds that can be used or sampled with a drum machine conveys many different meanings. For example, sampling a drum sound that reminds an artist of being "back in the day" to emulate nostalgia would be as appropriate as sampling a gunshot for a snare sound to emulate urban decay.*

The first recording produced in evidence of this document, *Analogous to Analog,* is primarily a live recording, which is to say there are only minimal pre-programmed tracks over which the band played or that were added in post-production. Again, the production of this recording has raised several issues in terms of what aesthetic(s) should be pursued and how

[8] "An Afternoon with Bill Putnam." Journal of the Audio Engineering Society 37:9 (September 1989), 723–730.

"An Overview of Recording Popular Music." Journal of the Audio Engineering Society 34:6 (June 1986), 490-503. Michael Billingsley, "An Improved Stereo Microphone Array for Popular Music Recording." AES 87th Convention 1989 October 18-21, New York.

[9] "Recombinant music" refers to music created in the styles of various composers by means of a contextual collage.

they might be achieved in a contemporary recording environment utilizing modern recording techniques and equipment. Ultimately, the decision was made to let the mood and inherent personality of each track determine the direction of its production values. As such, there are performances that sound acoustically "live" and "sonically spacious[10]", where the listener can hear/appreciate the size of the space in which that the sound was recorded, giving those tracks a feel (hopefully) idiomatic of early funk recordings. And, there are tracks that were recorded directly into the audio interface or with multiple close microphones delivering a very forward, present, and modern sound.

The second recording produced in evidence of this document, *Hybridization,* was initially produced from a DAW (digital audio workstation)-based platform. As such the sounds produced are quite "two-dimensional" and obviously synthetic, lacking the aesthetic of the "liveness" inherent to a live instrumental recording. Even after the addition of live guitar, bass, keyboard, and drum performances over the original DAW-based production, the "liveness" of the tracks is sometimes suspect. Additionally, in order to have the instruments "fit" sonically within the context of the source material, a certain amount of production had to occur in order to create an overall sense of cohesion within the tracks. The amount of production needed of course varied from track to track, but aesthetically the drums are not remotely sonically like those of early funk drumming recordings.

Another consideration in the process of the research for this document is the detailing of the evolution of the rhythmic vocabulary[11] used by the early funk drummers and the ways in which it has evolved into current performance practices. The issue lies in the structure of the drumming patterns themselves. Because funk drumming requires a particular framework to be danceable, there are certain elements that must always be present in some way. For example, a strong downbeat with the bass drum and beats two and four played on the snare drum is often employed. Of course, this is not true of every example, but it is of the vast majority. As such, there are only so many variations available within the 16th-note grid in a

[10] "Live" and "sonically spacious" are used here to describe two separate but equally important aesthetic qualities. First, "live" is used to describe the humanness of a performance and all the anomalies and variances that are inherent to a real time, human performance. "Sonically spacious" is used to describe the perceivable space in which a performance is captured.

[11] For clarification, the use of the word vocabulary in this context refers to the various drumming patterns as a whole, and also the individual rhythmic elements that constitute the whole.

4/4 bar of musical time. The result is that while there are indeed many funk patterns, many of them are quite similar in nature. Furthermore, it is only when players stretch out their patterns into two- and four-bar segments (or beyond) that they really begin to have distinction. It is at this point that the artistry of the player becomes critical. The way that a player may emphasize a particular beat or note, the way that they might employ a particular lope, or quasi-swing, the tempo at which the pattern is played, or even the tuning of the drums will have dramatic results on the audible aesthetic. In order to effectively detail and catalog the patterns and their evolution, one must consider not only the pattern metrically but also stylistically and contextually. So, while two (or more) drummers may have played identical (or near-identical) patterns, the effects of that performance could vary widely due to any number of the factors listed above.

Additionally, during the research stage, it became clear that the verb "sample" can have a wide scope of meaning. For instance, a funk drumming pattern may be sampled in its entirety so that the listener is able to easily identify the original, or the original pattern may be subdivided into multiple, smaller samples (i.e., bass drum, snare drum, cymbals, part of a drum fill, etc.) and reconstituted in a pattern that only somewhat resembles the original. As such, for the purpose of this document, only direct 1:1[12] samples are considered for discussion, which is to say if a pattern has been altered at all from its original performance, it has been omitted from consideration.

[12] A direct, 1:1 sample is one in which the original drumming performance occurs unaltered in the track in which it has been sampled. This does not however mean that additional layers of drumming/percussion are not present as well.

1. History and Evolution of Funk Rhythmic Vocabulary

Early Funk Drumming:

In order to present a clear picture of how the DJ/beat producer has influenced the modern drum set artist and vice versa, it is imperative that one understands the original source material: the drumming vocabulary that was the impetus for hip-hop and breakbeat culture. Funk drumming was not an overnight phenomenon, but rather, like so many other genre offshoots, evolved gradually until it was developed enough to stand apart as a distinctive art form. It is generally understood that funk evolved as an extension of R&B, boogie-woogie, and other Afro-centric infusions that were common in New Orleans (Caribbean, Afro-Latin, etc.). But what is generally under-addressed is the way that the rhythmic underpinnings morphed from a 12/8 (swing/shuffle) feel to that of a straight, evenly spaced eighth-note feel. As Alexander Stewart (2000, pg. 294) makes clear,

> *By the 1950s certain musicians in the popular realm, such as Little Richard, Chuck Berry, Bo Diddley and Jerry Lee Lewis, began to break away from shuffles or 12/8 metre. The voluminous literature on American popular music has seldom discussed this phenomenon except in terms like 'boogie', 'shuffle','rocking', 'driving', 'rolling', 'dotted', etc., that are often used imprecisely and unclearly to imply metric qualities (for a few examples, see Palmer 1979; Gillett 1996 [1971], pp. 95, 133)…."What seems clear is that, though early rock 'n' roll often maintained the 12/8 metre along with other things it borrowed from R&B, by the early 1960s an even-ing of the basic subdivision of the beat linked to new styles of dance movement had become emblematic of modern youth, while jazz, swing and shuffles were largely relegated to the previous generation.*

Artist, educator, historian, and author Jim Payne has performed and recorded funk music with artists such as Maceo Parker, Fred Wesley, Pee Wee Ellis, Michael Brecker, Dave Liebman, Slickaphonics, the Radio City Music Hall Orchestra, and The Jim Payne Band, among many others. Additionally, his texts *Give The Drummers Some: The Great Drummers of R&B, Funk & Soul* (Mel Bay 2016), *Drumming with the Mambo King* (Hudson Music, 2000), and *Tito Puente: King of Latin Music* (Hudson Music, 2006). Payne offered these remarks when interviewed (I15.):

> *Well, in terms of…watershed - from the blues to some kind of a straight feel,…Little Richard…he's playing straight and the other guys are swinging. …Right there is kind of where it sort of broke apart into more of a straight feel - and then rock and roll…that was it…it became that became the whole thing.*

> *Little Richard and that first album, "Here's Little Richard," which was one of the most influential records in my life…it just broke open all these barriers back then - whenever it was late 50s. ...Earl Palmer played on that. And it seems like that was a real transition point right around that area. ...It's got it all; it's got one rumba, it's got a couple of slow triplet blues, it's got shuffles. And then it's got that big "Slippin' And Slidin' and "Lucille." The things that are really jumping…the back beat was just kind of overwhelming. It fit in with the great saxophone section and the guitar and all that. And of course, Little Richard's pounding away on the piano.*
>
> *A couple…of things: one is the grooves up until then were pretty much either shuffles or blues, triplet-based rhythms. And then in certain recordings, Chuck Berry and Little Richard - particularly Little Richard playing the piano - he's playing the piano in eighth notes - 1 & 2 & 3 & 4 & - and the band [sings shuffle backbeat pattern]. ...Formally…you're not supposed to do that. But they did it - so what? It came out great…it had this fat type of groove. Same with some Chuck Berry stuff…"Johnny B. Goode." So that was that was a real transition rhythmically.*

As pop music evolved from the prevalent 12/8 and shuffle-influenced beats of the 1950s, to something in between swung and straight, to patterns that were ultimately 16th-note based and metrically quite even, the patterns began to emphasize the downbeat or "the one" rather than beats two and four exclusively. This musical "straightening-out[13]" phenomenon is most likely the natural result of the increase in the tempi, since playing up-tempo shuffle patterns is simply uncomfortable. As the shuffle/swing tempi began to approach a double-time feel, it was easier and more effective to simply play the double-time 1/4-note on the hi-hat (or 1/8-note in a 4/4 context).

Of course, backbeats (beats two & four) are still the cornerstone of pop music, but the heavy emphasis on beat one had the effect of grounding the rhythmic underpinnings in a way that would allow for much more syncopation in the remainder of the metric bar and the band. Most notably the bass guitar was liberated in a way that allowed it to play lines that were often rhythmically counterintuitive to what the drum patterns were outlining. Additionally, guitar, keyboard/piano, horn lines, and vocal performances became more rhythmic and seemingly percussive in nature, and often featured ostinato or hemiola. For example, one might consider performances on "Papa's Got a Brand New Bag" (1965) and "I've Got You (I Feel Good)" (1965) by James Brown, "It's Your Thing" (1969) by the Isley Brothers, and – later and more obviously – "Cissy Strut" (1969) by The Meters.

[13] Musical "straightening-out" is used to describe the evolution from musical patterns that had historically been rooted in triple meter to those expressed in duple meter.

This is not to imply that the drum patterns were always simple articulations of 4/4 time with a strong downbeat on the bass drum and the obligatory snare hits on beats two and four. Quite the contrary, the drumming patterns in this new, 16th- and 8th-note based style gave drummers unprecedented freedom to play significantly more complicated or "busy" figures that would create a frenetic feel for the listener. "Cissy Strut" (1969) or "I've Got Money" (1962) again serve as excellent examples here. This phenomenon might be seen as parallel to the way that drummers in the jazz idiom were given much more rhythmic freedom to express themselves as bebop jazz evolved from big band, though with substantially different results. While bebop was high art music constructed for a quiet, often seated, audience, funk was a music whose primary objective was to illicit movement from the audience in the form of dance.

Funk, according to Philip Morehead (in the 1992 *New International Dictionary of Music*), states that funk is "a term of uncertain origin indicating a style of African-American popular music." Clearly, this is not helpful, but there are scarcely better definitions offered by any other scholarly reference materials. Oxford Music Online defines funk as:

> *An African American popular music style. It features syncopated interlocking rhythm patterns based on straight quaver and semiquaver subdivisions, a vocal style drawn from soul music, extended vamps based on a single and often complex harmony, strong emphasis on the bass line, and lyrics with frequent spiritual themes and social commentary. The use of the term for a musical style inverts the negative colloquial meaning of strong aromas, particularly of a bodily and sexual nature.* (Bracket, David. "Funk." *Grove Music Online,* Oxford Music Online, 20 Jan. 2001, https://doi.org/10.1093/gmo/9781561592630.article.46626. Accessed July 2019.)

While accurate, this definition does little to illuminate the essence of what the syncopated nature of funk music actually *is* or what it *feels* like in relation to that which came before or occurred after. Interestingly, there is no shortage of scholarly texts *about* funk music; its historical, social, cultural, and/or political relevance[14].

[14] Authors relevant to these funk music topics are mentioned in paragraph 1 of Introduction: Research Focus.

Influence of the Clave

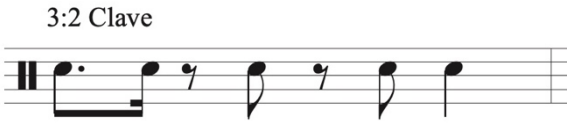

Figure 3. 3:2 Son Clave

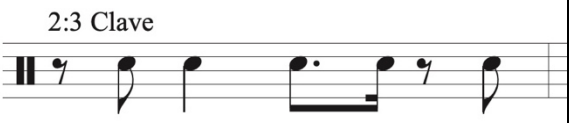

Figure 4. 2:3 Son Clave

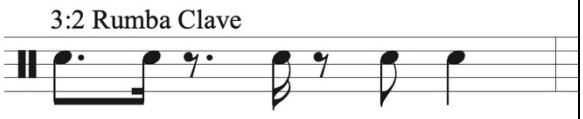

Figure 5. 3:2 Rhumba Clave

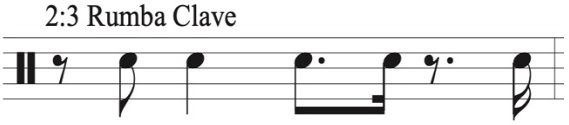

Figure 6. 2:3 Rhumba Clave

In a very general sense, funk drumbeats can be said to generally fall into one of two categories: either the patterns feature the bass drum prominently on beat one only, or on beats one and three equally. When funk drumming patterns only feature a heavy bass drum on beat one, subsequent bass drum notes will land anywhere but beat three, though they (or a combination of bass drum and snare) will typically also land on the "ah"[15] of beat one and the "and" or "ah" of beats two and three, in some way. This type of funk drumming pattern (which seemingly is based on the 3:2 clave)[16] gives an overall impression of space and creates a laid-back feel, even when performed at fast tempi.

[15] In this document, semiquavers will be described in the American vernacular "1, e, &, ah" fashion.

[16] The clave is known to be the seed of New Orleans 2nd Line drumming, which is one of the significant precursors to funk drumming. However, the exploration of 2nd Line and clave falls well beyond the scope of this discussion and may prove to be worthy of further, future study.

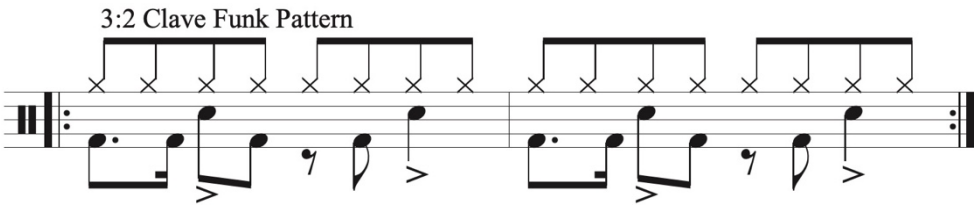

Figure 7. 3:2 Son Clave-based Funk Pattern

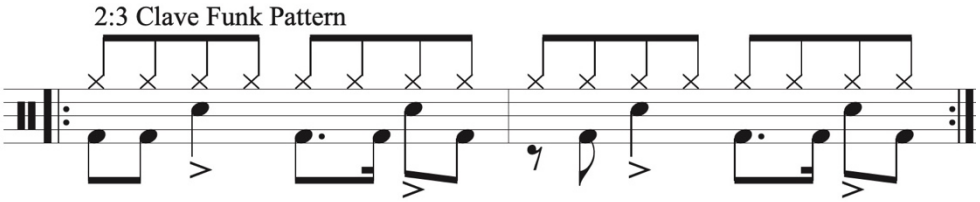

Figure 8. 2:3 Son Clave-based Funk Pattern

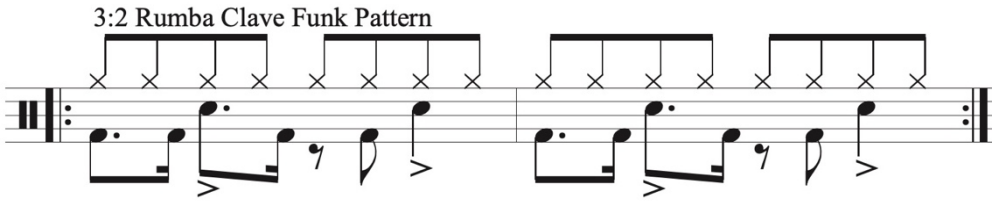

Figure 9. 3:2 Rhumba Clave-based Funk Pattern

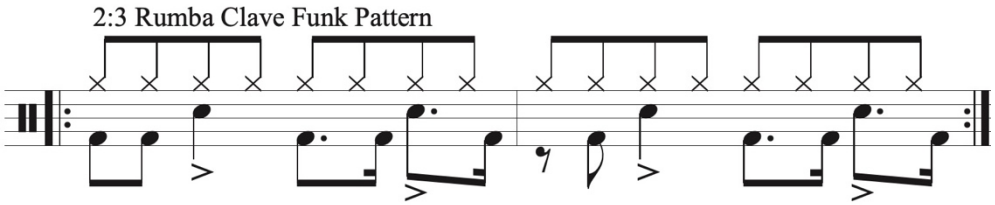

Figure 10. 2:3 Rhumba Clave-based Funk Pattern

Clave translates from Spanish to English as “key,” as in the device that opens a lock. I believe this is significant as it is clearly one of the primary sources for so many funk drumming patterns. Clave is the rhythmic foundation of many African, Caribbean, and Latin styles and generally falls into one of two variations: Son clave or Rumba clave. The pattern is typically described as 3:2 or 2:3, which is to say that the rhythm is comprised of a group of 3 notes followed by 2 notes, or vice versa. When interviewed, Payne had this to offer (I15.):

…And then you got the Latin thing going on down there… I was so fascinated by the Latin thing and how it was sort of in funk that I went and started studying Latin music. I went down to Cuba and I interviewed Tito [Puente] and we wrote the book together.

The difference there, of course, is the Latin music is a straight up and down type of music. And they write it out at eighth notes, [sings 2:3 Cascara rhythm] 1 & 2 & 3 & 4 &. And the funk people are 1 e & a 2 e & a. So, we're like, [sings 2:3 Cascara rhythm], same exact rhythm only…everything is divided in half.

…I think Earl Palmer and some of these guys…sort of shaded the music…towards the eighth note. …First, you have a kind of a rumba thing [sings Rumba percussion rhythm]. …I was listening [to Little Richard] on Spotify and some of those tunes, they had two takes…and the first thing sounded like a Rumba [sings Rumba percussion rhythm] and then it ended up just being backbeats [sings early rock 'n' roll drum pattern]. And so, they incorporated that idea.

…Latin music, you've got the clave as the basis…the 3:2 [sings 3:2 clave]. That was the basis of some of those tunes back then. Like "Bo Diddley" (1955). I saw him one time and it was just a drummer, maraca player, and him…that was it. And they just laid on that groove and everybody kind of went wild…it was infectious. …The clave came in there, …not as traditionally Latin with Rumba and all that - it's just that basic rhythm that became part of rock and roll. And then it went in different parts of the kit, like the bass drum. If you're talking about 16th notes, it could be [beat] 1 and the 'a' of 1 [sings funk bass drum and snare pattern]. That could be the basis of the whole groove right there…the clave then became infused into rock and roll. You just orchestrate the clave around the [drum] set somehow. …Most of the time it's just the three side [of the clave, sings 3 side of 3:2 clave], and then whatever happens after that.

It's so cool, the element of…grouping sixteenth notes in threes. You got: 1 2 3, 1 2 3, 1 2…however you want to do it. When you start grouping sixteenth notes in threes, you create another motion that's going along like you're hearing it in three, but it's really in four. So that is key to tons of stuff.

As Jim Payne makes clear, there is an obvious connection between the Latin music styles and early rock 'n' roll. Though perhaps not a direct 1:1 correlation, the influence of the clave rhythm can be seen within the patterns of early 8th-note rock 'n' roll drumming patterns.

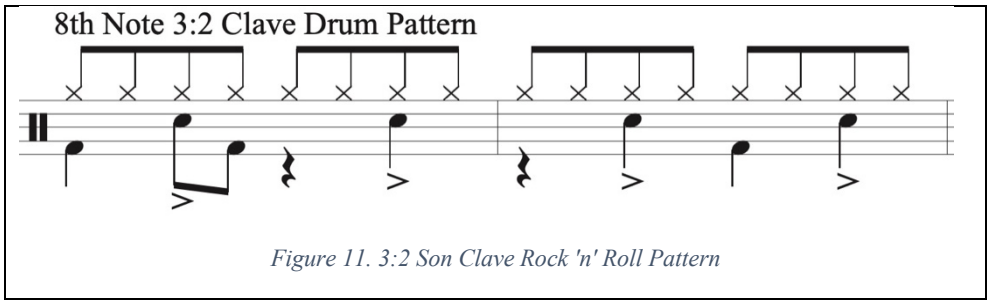

Figure 11. 3:2 Son Clave Rock 'n' Roll Pattern

Artist, producer, and educator, Adam Deitch performs with his band Lettuce and Break Science and has performed with John Scofield, Pharoahe Monche, Ledisi, DJ Quick, Average White Band, Soul Live, and Pretty Lights. When interviewed, Deitch had this to offer (I3.):

> *I mean, it would all start with New Orleans, right? That's where the invention of the trap set happened - Congo Square. All the African slaves being brought over there, also other places, Brazil, and Cuba. But in America, Congo Square is the birthplace of funk. And the intersection of jazz, funk and parade street beats - all three of those things were birthed out of Congo Square. A lot of the earliest backbeats and grooves were from that area of the world, from New Orleans. …Clave is the universal DNA of all rhythm, in all cultures, from Morocco to Brazil to West Africa. Especially African based cultures, clave is king. Clave is the guide that tells you where [beat] one is, and where the downbeat is, and where to fit in around it. All rhythms are placed around the clave. I teach my students all the time, clave is the DNA of a funky rhythms.*

From Deitch's comments we can gather a sense of the organic evolution/inclusion of Latin styles into those musical styles that were already evolving in parallel with one another. Latin music, jazz, 2nd Line, Dixieland, wind band music, and Western art music were all prevalent in New Orleans in the early 20th century. It is widely understood that there was a comingling of musicians and that these musicians would certainly have shared their musical ideas and influences amongst themselves. As such, it is easy to imagine the musical cross-pollination of musical influence that would occur within this region. And further considering the ease of travel in post-industrial America, these musical influences would have been able to spread quickly and to great distances.

Non-Clave influenced Funk Patterns

Funk drumming patterns that feature the bass drum prominently on beats one and three are far more typical in the 1960s and 1970s, though the feeling produced by such a pattern is drastically different than those of the clave-influenced patterns. The heavy, pronounced articulation of beats one, two, three, and four has the effect of creating a pattern that encourages a feeling of something akin to a rudimental march. This would ultimately become the foundation for disco and early hip-hop due to its ability to sound all four beats evenly and clearly.

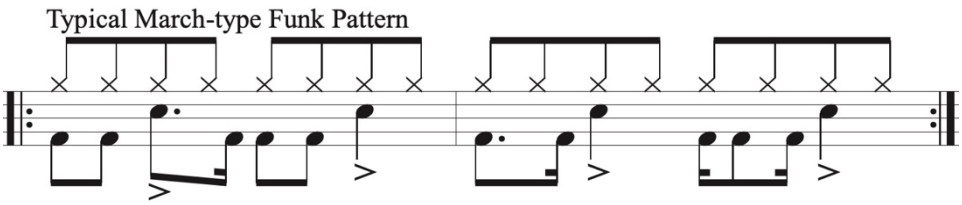

Figure 12. March-type Funk Pattern, emphasizing all four beats

To this end, early funk drummers were quick to throw off their 12/8 shackles and get busy filling in the new, larger rhythmic spaces afforded to them in this metrically-even 4/4 landscape. In James Brown's release "I've Got Money," (1962) drummer Clayton Fillyau starts the track with an infectious and busy pattern that would have been outrageous to listeners at the time. Fillyau opens "I've Got Money" with 26 bars of this pattern (a pick-up into a 2-bar intro followed by two 12-bar phrases) before the rest of the band enters. James Brown was evidently aware of how unique Fillyau's drumming performance was and had a clear objective in giving him what was essentially a solo over two passes of the 12-bar form at the top of the track. Furthermore, the drums are essentially the only instrument playing during the subsequent verses of the track (other than a reoccurring guitar strum). Highlighting the drum set performance in this way constituted a new way of arranging music, one in which the drum set was a central factor, as Vincent makes clear: "Brown had figured out how to orchestrate a drum set and make everything in the band work around a groove, rather than a melody. It was a revolution that still impacts us today." (Vincent, 1996. pg. 72) hip-hop music is still constructed in much the same way today. In my interview with Jim Payne, I asked:

"Do you know of any drumming patterns like those played in "I've Got Money" that existed anywhere before the release of that recording?"

Jim Payne (I15.):

> *As far as I know, I am not I'm not aware of anything… I mean it's really hard to find who started what…*

Payne's sentiment has been echoed by many of the artists that I have interviewed during the course of this research, particularly in regard to determining which drummer(s) contributed or made prevalent which patterns first.

Adam Deitch (I3.):

> *I look at a funk drumming as just a piece of the puzzle. In funk music, every instrument: guitar, horns, keyboards, bass, percussion, are all rhythmic instruments first. And they are mimicking an African group playing all percussion instruments. You have djembe, you have bells, you have shekerés, you have all this stuff. If you take a look at how all the percussion fits together into one piece around the clave - that's how funk is put together. It's kind of like a microcosm for society. Like, if everyone does their part, and it all works together, it's this beautiful thing.*

As Deitch makes clear, funk rhythms were not relegated solely to the drums and/or rhythm section, but were the product of all the rhythmic contributions from all performers, instrumental and vocal. James Brown may have been the first to use this type of instrumental arranging, as an early progenitor of funk music. They way that he orchestrated many simple, repetitive, and disparate instrumental (and sometimes vocal) parts together to create an effective, syncopated, and decidedly funky feel would be the template of many acts that would follow, such as Parliament, P Funk, Ohio Players, Sly and The Family Stone, etc.

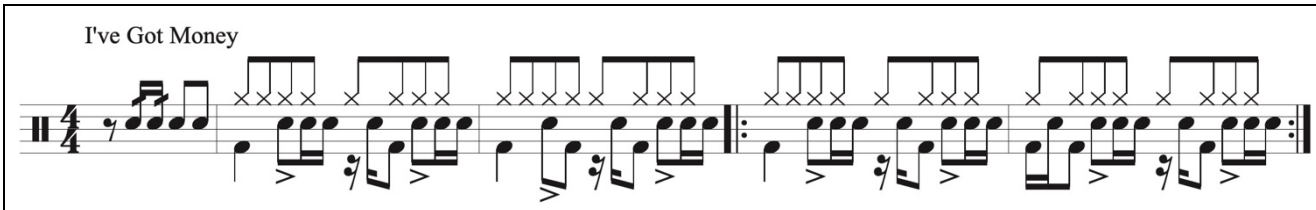

Figure 13. Excerpt: Clayton Fillyau's Drum Beat on James Brown's "I've Got Money"

True to the nature of funk (though this may be one of the first funk drumming recordings), one will notice the sparse playing of the bass drum. It plays prominently on the downbeat of each bar in Fillyau's 2-bar pattern and to a lesser degree on the "and" of beat three and then on the "and" of beats two and three respectively. Though this pattern does not reflect the 3:2 clave idea, it is certainly not of the march variety, with heavier beats one and three.

Having the "I've Got Money" drum pattern featured so prominently in 1962 was unheard of in pop music. Combine that with the jittery tempo (BPM ≈ 165) and dense rhythmic performance and you have a beacon for change, a prototypical example of funk, breakbeat, and drum and bass drumming.[17] The heavy downbeat on the bass drum would become a stylistic characteristic in funk drumming, but the sparse bass drum playing in Clayton Fillyau's "I've Got Money" performance would quickly evolve into much more syncopated and rhythmically dense performances. What is clear is that the transformation to a 16th-note-based underpinning dramatically altered the approach of drummers in the burgeoning rock 'n' roll genre as well as the drummers already performing R&B music. In 1962, with James Brown's recording of "I've Got Money," it would seem as though breakbeats had been immediately distilled, almost as an epiphanous moment. Though again, it is almost certain that Fillyau had heard or constructed his pattern as a result of influences, consciously or otherwise.

Clearly, it is inconceivable that James Brown and his drummers were the only purveyors of funk drumming knowledge. However, there were very few popular acts in 1962 that were getting airplay or any attention that utilized beats that could even be considered proto-funk. In Billboard's Top 100 in 1962, only 60 of the 100 tracks were not in 12/8 or shuffle feel, and of those 60, many were in a quick 2-feel, were country/western, or otherwise very much in the tradition of early rock drumming. Also quite prevalent was the drum pattern ubiquitous to Motown tracks of that time, the four-on-the-floor snare drum pattern, which was the precursor to the four-on-the-floor bass drum disco pattern (figure 12). There is not one example of a drum pattern that could be considered funk in any way in the Billboard Top 100 of 1962, further evidence of Fillyau and Brown's ingenuity. But like so many trends that germinate, take hold, and become the zeitgeist, funk drumming was occurring and spreading ("Billboard Top 100 - 1962." *Billboard Top 100*, http://billboardtop100of.com/1962-2. Accessed July 2019.)

It is interesting to note in regard to Payne's previous statement that the early 1960s drum pattern as described in Figure 12 reflects the "3" side of the 3:2 clave.

[17] This pattern was later sampled on Will.I.Am's 2003 single, "Go!." Will.I.Am also uses other samples from Brown's "I've Got Money," most notably the strumming of the guitar and three chromatically ascending chords prevalent at the 0:38" mark.

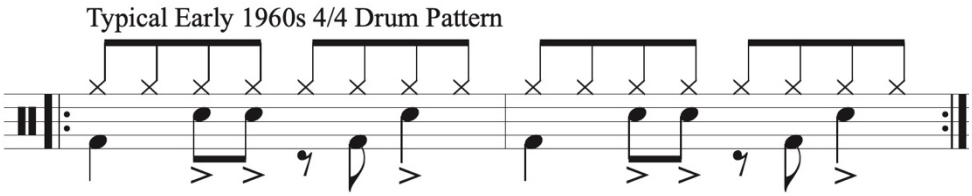

Figure 14. Typical Early 1960s Rock 'n' Roll Pattern

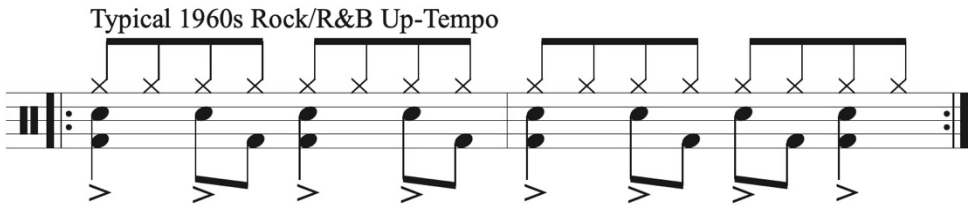

Figure 15. Typical Motown Drum Pattern

There was another popular release in the same year (1962) as Brown's "I've Got Money," a track by Steve Alaimo[18], "Mashed Potatoes (Parts 1 & 2)." Not to be confused with Brown's previous release, "Do the Mashed Potatoes," Alaimo's version was clearly in 4/4 compared to the many popular 12/8, shuffle versions that predated it. And considering how similar the drumming pattern is on this track, it would suggest that Alaimo's drummer had heard "I've Got Money" at some point[19]. In fact, as it was James Brown's band that was backing Alaimo, it is conceivable that it was Fillyau on the recording, though no credible evidence can be found to corroborate this. Nevertheless, what is clear is that the drummer in Alaimo's band was evidently familiar with James Brown's funk style.

[18] Alaimo was later instrumental in exposing James Brown to a much wider audience when he repeatedly featured Brown on his music variety show, *Where the Action Is.*

[19] No information could be found about the musicians on Alaimo's "Mashed Potatoes." It was not uncommon for backing bands at this time (or presently) to be unnamed.

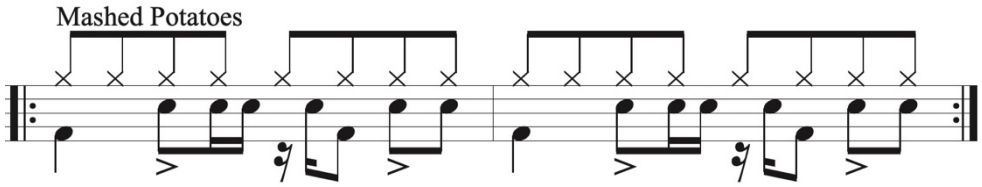

Figure 16. Excerpt from Steve Alaimo's "Mashed Potatoes"

Thanks in part to Brown's three Billboard hits on the R&B/Soul chart – "Night Train," (1961) "Shout and Shimmy," (1962) and "Lost Someone" (1961) in the early 1960s—it did not take long before funk drumming was taking strong root in R&B/Soul (or in rock'n'roll) and the drumming patterns quickly became more syncopated, busier, and/or begin to fall into one of the two aforementioned categories: the clave or march type pattern.

Funk Drumming Evolved

It took until around 1966 for the funk drumming language to present itself fully formed. Popular R&B acts like Sam & Dave, Chuck Jackson, Wilson Picket, Joe Tex, Lee Dorsey, Slim Harpo, and Stevie Wonder had all begun to incorporate funk drumming into their music. And funk drumming was finding its way into pop/rock as well with acts like The Turtles, Tommy Roe, and The Lovin' Spoonful. Through the mid and late 1960s the emergence of funk as a distinct genre would become undeniable with acts like James Brown, Isaac Hayes, Sly and the Family Stone, The Meters, The Isley Brothers, War, and Buddy Miles leading the way forward.

In the late 1960s it was not uncommon for R&B/soul or rock 'n' roll recordings to feature drum breaks, sections in the track that featured drums only (or so prominently as to be a solo). These drum breaks would often feature the same pattern that the drummer was playing during a verse or chorus, though on occasion the break was an opportunity for the drummer to show off by expanding on the pattern's complexity and/or syncopation or by simply playing an altogether different, and possibly more exciting, pattern. Perhaps the best example of this can be found on the 1969 recording by The Winstons with their drummer, Gregory Sylvester Coleman, titled "Amen, Brother." According to WhoSampled.com, the drum break in "Amen, Brother" had been sampled at least 3138 times at the time this document was

produced ("Amen, Brother." *WhoSampled,* https://www.whosampled.com/The-Winstons/Amen,-Brother. Accessed July 2019) At 1:28" in the track the drum break occurs, and the break pattern is an elaboration on the pattern that drummer Gregory Coleman played during previous verses. The use of the drum break in "Amen, Brother" is quite typical of early funk recordings and even found its way into some of the pop/rock recordings of the same period.

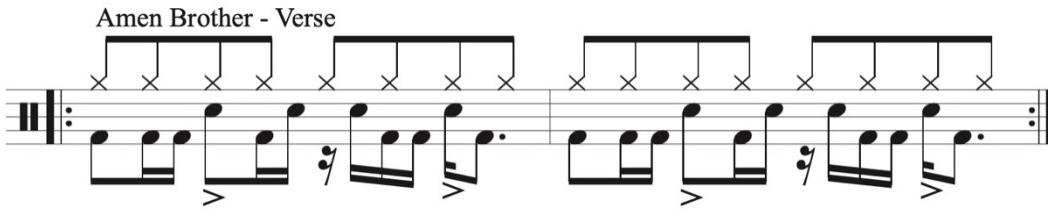

Figure 17. Excerpt: The Winstons "Amen Brother" Verse

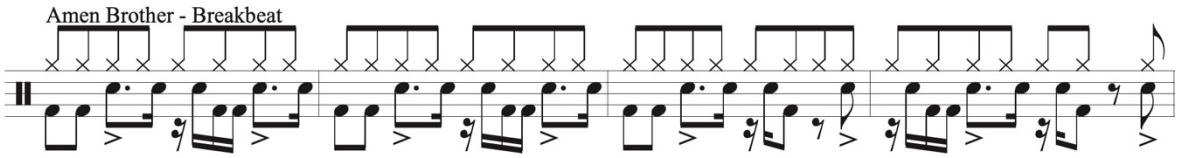

Figure 18. Excerpt: Breakbeat in "Amen Brother"

The Mohawks, Harry Nilsson, Iron Butterfly, The Bar-Kays, and Jimi Hendrix were among the early trendsetters in the pop/rock genre utilizing funk drumming in their tracks. While there were still obvious distinctions between the white, radio-friendly pop/rock acts and the African American pop/rock acts, funk drumming was finding its way into all segments of pop/rock culture, and it was a catalyst for crossover success between white and black radio[20].

For example, Jimi Hendrix's track "Fire" (1967) features Mitch Mitchell's drumming prominently and the pattern is utilized characteristically (nearly as a solo) during the verses of

20 It is perhaps interesting to note here that while many African American acts played rock'n'roll or funk music in the mid and late 1960s, they were always classified as R&B or Soul artists. This is likely evidence of America's racism and narrow-mindedness. This makes finding examples of early funk music challenging as funk genre-based searches are ineffective.

the track. Harry Nilsson's track "Rainmaker" (1969) is another example that features obvious funk drumming paired with easy, sing-song vocals, piano, and acoustic guitar performances, making it an obvious choice for radio play on white pop/rock radio.

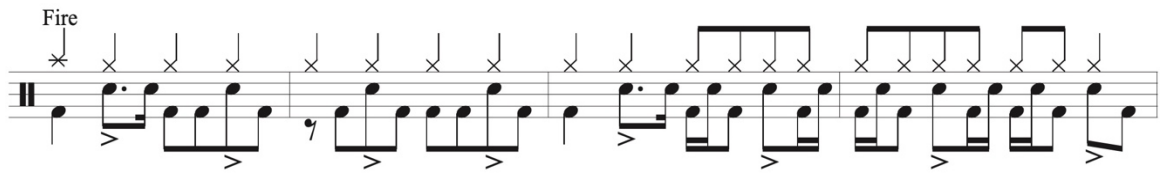

Figure 19. Jimi Hendrix - "Fire" Verse

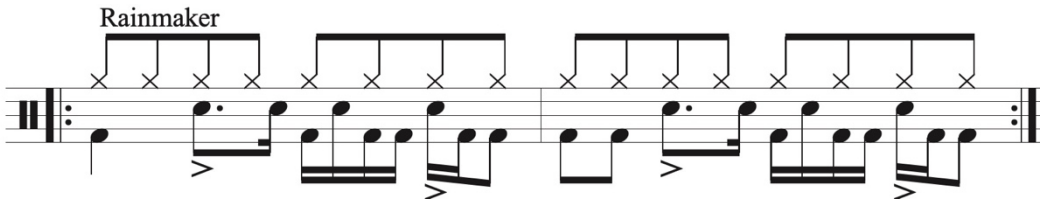

Figure 20. Harry Nilsson - "Rainmaker" Verse

By the 1970s the lines of pop/rock, R&B/Soul, and funk were beginning to blur. Bands across all genres were writing music that could fit easily into other genres. Pop/rock bands were writing funk-based tracks, R&B/Soul bands were creating progressively fewer 12/8 or shuffle-based tracks, and funk bands were beginning to self-identify as such. Artists like Little Feat, Santana, The Honey Drippers, Isaac Hayes, Average White Band, Aerosmith, Tower of Power, Thin Lizzy, The Isley Brothers, The Brothers Johnson, Rare Earth and of course James Brown, were all involved in, or heavily influenced by, funk music. The 1970s were truly a golden age for funk music and, in particular, the dissemination of funk drumming. Funk drumming was nearly ubiquitous on FM radio.

Trevor Lawrence Jr. is a drummer and producer whose playing and production credits include some of R&B and hip-hop's most established names, including Jimmy Jam and Terri Lewis, Macy Gray, Stevie Wonder, Ashanti, Stanley Clarke, Lionel Ritchie, Snoop Dogg, Dr. Dre, 50 Cent, Eminem, Herbie Hancock, The Temptations, Jennifer Lopez, and Taj Mahal to name

but a few. When asked what funk album stands out in his mind as seminal and most influential in the development of funk music, Lawrence says (I10.):

> *James Brown['s] album called "Love, Power, Peace," (1971) which is the most aggressive, the fastest, the most precise, ...all the arrangements that you can trace from the 60s albums like "Live at the Apollo." ...That was right when Bootsy and them came in young. And it just was a whole other level of syncopation. The arrangements are unbelievable. That record right there is one of most important records.*

Through the 1970s, the funk drumming of the 1960s was evolving into a more refined, distilled, and quintessential version of itself. In general, funk drumming patterns were less busy than those of the previous decade and the tempi were slowing and becoming ever more groove-oriented. Funk drumming patterns that clearly featured beats 1, 2, 3, and 4 were the rule now, rather than the exception. Indeed, through the 1970s, playing the bass drum on all four beats (commonly referred to as "four on the floor") became increasingly commonplace, inevitably ushering in the age of disco[21]. According to George Clinton, arguably one of the most influential artists involved in the evolution of funk music, disco is a watered-down distillation of what funk music is supposed to be (Fricke, David. "George Clinton: The Rolling Stone Interview." *RollingStone.com,* 20 Sept. 1990, https://www.rollingstone.com/music/music-news/george-clinton-the-rolling-stone-interview-230616/. Accessed August 2019). The creators of disco recognized that what kept people on the dance floor was a steady quarter-note pulse, most effectively performed by the bass drum. In fact, even within the early hip-hop community there was a rift between rappers who employed disco-oriented funk beats (i.e., DJ Hollywood, The Sugar Hill Gang) versus those who employed funk beats derived from early funk recordings (i.e., Grandmaster Flash & The Furious Five, The Fantastic Five).

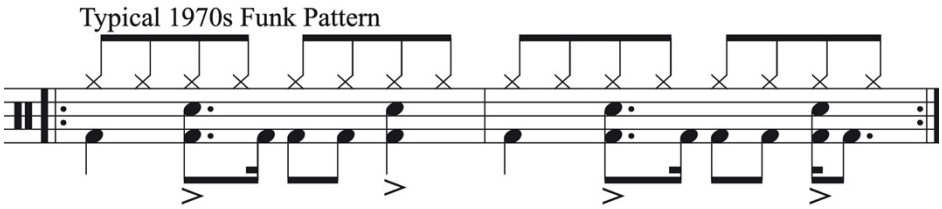

Figure 21. Typical 1970s Funk Pattern

[21] The study of the evolution of disco falls outside the scope of this research and therefor will only receive limited commentary insofar as it relates to the evolution of hip-hop.

Of course, there were (and still are) drummers that were pushing the technical boundaries of their craft in the 1970s, playing increasingly complex patterns that required much more independence in the limbs and dexterity in the hands and feet. “Cissy Strut” (1969) by The Meters is a prime example of a type of drumming that was far outside the norms of conventional funk drumming at the time, though it has become a template for a style known as “linear” funk drumming[22]. As such, it has become a staple of funk drumming education. Zigaboo Modeliste, a drummer raised in New Orleans and heavily influenced by the rich and diverse musical culture there, brought a wide range of influences—from 2nd line, jazz, and Afro-Caribbean to R&B/soul and rock ’n’ roll – to his playing in The Meters. Modeliste’s playing influenced many drummers throughout the late 1960s and 1970s, perhaps most notably players like Dennis Chambers (Parliament/Funkadelic and many others) and David Garibaldi (Tower of Power). However, the vast majority of patterns still fit comfortably into either the 3:2 or march variety.

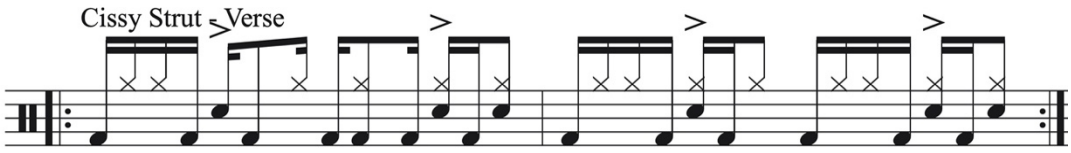

Figure 22. The Meters - "Cissy Strut" Verse

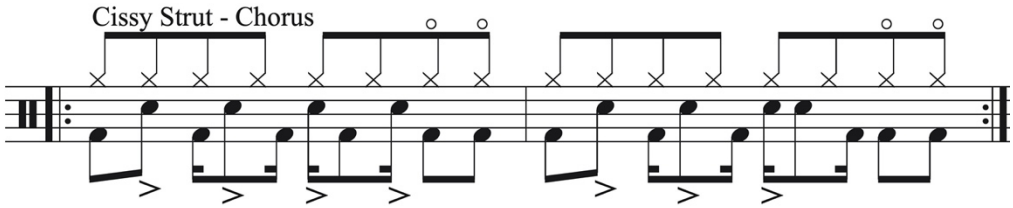

Figure 23. The Meters - "Cissy Strut" Chorus

Also of interest is the way in which the metric focus has shifted since post-shuffle drumming patterns of the 1960s, from a heavy beat one, to a pronounced beat two and four, to the

[22] Linear drumming is a method of playing drumming patterns in a way that generally disallows the performance of two voices sounding simultaneously. All four limbs can be (and often are) employed though they must be done so sequentially.

emphasis of beat three in the half-time feel that is so prevalent in today's music. When funk drumming first emerged in the 1960s, the emphasis was placed heavily on beat one[23]. This is evident in most every James Brown funk track. As we move into the 1970s and tempi decrease, the emphasis (although still clear on beat one) shifts to beats two and four, as can be heard on almost any pop track from that era. This remains though the evolution of popular music and the advent of hip-hop until the late 1990s/early 2000s, when the half-time groove makes its entrance[24] and develops enough staying power to become ubiquitous as a template for breakdown and bridge sections of pop tracks[25], eventually giving rise to genres that use this feel as a convention, i.e., dubstep and trap.

All the same, classic/iconic drumming patterns that were first presented in the early 1960s through the 1970s will certainly continue to be heard in contemporary music. Many of these clave and march-type funk drumming patterns will remain simply because they are effective at communicating a feel and groove, and also because hip-pop influence (whose primary influences are the original funk grooves) has become so prevalent in so many popular music genres. Within the context of my own practice-based output I have drawn on these iconic patterns and used them either exactly as they were performed on historical recordings or was inspired by them in creating my own new music. Further discussion of these patterns and their influence and significance will be presented later in the text.

[23] As James Brown instructed Bootsy Collins: "Son, give me the one. You give me the one, you can do all those other things."

[24] To be clear, half-time grooves existed in popular music before the 1990s. A number a notable examples use this as the primary pattern or as a bridge or breakdown pattern: Funkadelic's "Loose Booty" (1972), The Cars' "Just What I Needed" (1978), Led Zeppelin's "Fool In the Rain" (1979), The Police's "Don't Stand So Close To Me" (1980), Toto's "Rosanna" (1982), Billy Idol's "Eyes Without a Face" (1983) and, a-ha's "Take on Me" (1985).

[25] Popular music examples employing a halftime feel post 1990: No Doubt, "Just a Girl" (1995), Mariah Carey, "Butterfly" (1997), Erykah Badu, "On & On" (1997), R. Kelly, "Get Up On a Room" (1998), Lenny Kravitz, "Fly Away" (1998), Fall Out Boy, "Sugar, We're Goin Down" (2005), Iyaz, "Replay" (2009), Jason Derulo, "Whatcha Say" (2010), Imagine Dragons, "Radioactive" (2012).

2: Proto hip-hop/Rap and Live Drumming

Live drumming certainly played a role in early hip-hop music. Because much of the rapping in the late 1970s and early 1980s happened over disco, funk, or R&B breaks, it is easy to surmise then that much rapping was performed to recordings of live drumming. Between 1979 and 1983, several prominent hip-hop tracks utilized live drummers, most notably "Rapper's Delight" (1979) by the Sugar Hill Gang and "The Message" (1982) by Grand Master Flash. Though certainly not the norm, live drumming had made its way onto the world stage in hip-hop.

Adam Deitch (I3.):

> *I realized early on that hip hop was sampling my favorite funk records. And because I had a pretty decent knowledge of funk at an early age, by 11 or 12 years old when my parents brought me a Fat Boys tape and a Kurtis Blow tape for Christmas, I realized that these grooves were coming from Go-Go. A lot of Go-Go stuff from D.C. Bands like Trouble Funk, EU and Chuck Brown. That is a huge part of the DNA of hip hop and it's also part of the family tree. Which is going…all the way from West Africa to New Orleans, to the funk that we all know and love – 60s, 70s funk. And then in the late 70s, there was a movement. When disco hit, it didn't really pop off in black communities that much. Once it became like "Saturday Night Fever"…that became like a white version of black music. That's why I've never liked disco. Early disco was black music. And it was funky and it had a swing to it and a feel. When that disco craze hit in the late 70s, D.C. had this anti disco movement…, they slowed it down, they put that clave rhythm on the kick drum. (Sings clave- based drum groove). …And the band would play for a second, then give it to the drums for eight bars. Then a band would play for four bars and give it to the drums and percussion for another eight bars. And then there were a chant on top of that, "If you are feelin' good say yeah…'Yeah!'" All that…was Go-Go you know. That is what really birthed hip-hop to me.*

In 1979, a watershed moment occurred with the release of "Rapper's Delight" by the Sugar Hill Gang on Sugar Hill Records. Though "Rapper's Delight" was certainly not the first recorded track to include rapping in some way, it was the first track to attain international notoriety, selling more than 10 million copies worldwide. The music for "Rapper's Delight" was performed by the house band at Sugar Hill Records and included the performance of drummer Keith LeBlanc. Though the track was essentially a blatant copy of Chic's popular dance track "Good Times" (1979), the performance was clearly live (non-repeating drum fills can be heard throughout at the ends of phrases) and set the stage for future live hip-hop drumming performances. It is interesting to note, however, the influence of technology on this drumming performance. For instance, instead of a snare drum strike on beats two and

four, hand claps are used (seemingly imported from another recorded track) until the second verse, when a snare drum can be heard to enter on beats two and four. Then at the third verse, the backbeats return to hand claps only. The snare does return at various intervals during the seven-plus minute-long track, but this sort of production of varying the backbeat sound would become and remain a hallmark of hip-hop production.

One can easily see from the drum notation of Chic's "Good Times" the influence of disco on the musical feel of "Rapper's Delight." The nearly continuous drum pattern emphasizing all four beats is ubiquitous of disco. However, it is interesting to note that the hi-hat pattern varies with drummer Tony Thompson's improvisations (beyond the notation provided) during the performance of the verse, adding nuance and a sense of live-ness to the pattern/performance.

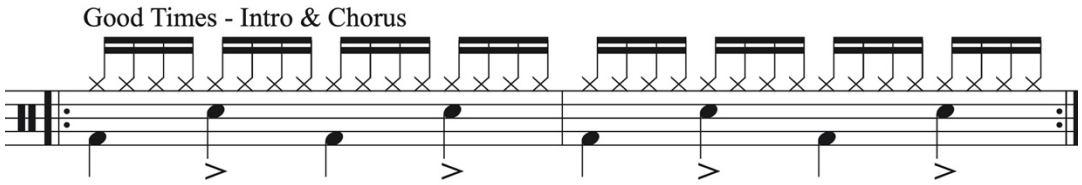

Figure 24. Excerpt: Chic's "Good Times," Intro & Chorus Pattern

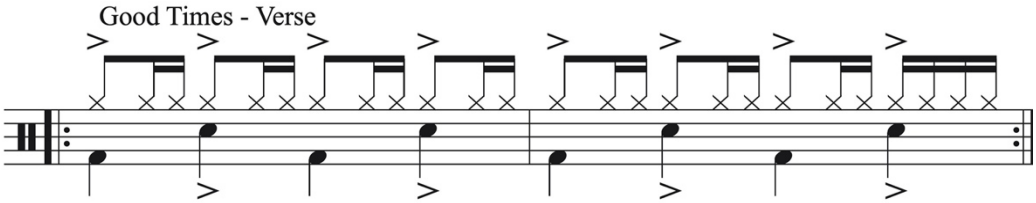

Figure 25. Excerpt: Chic's "Good Times," Verse Pattern

By contrast, the drumming patterns used in Grandmaster Flash's 1982 "The Message" were much more in line with 1970s funk drumming. Though the pattern is quite static, it does use a pattern that is not simply a one or two bar loop. This is because the pattern was performed (apocryphally) by the not-yet-famous Dennis Chambers, though it might also have been performed by Keith LeBlanc. The reason for the ambiguity is that there are no credits for

instrumental performances associated with this track. Regardless, the drum performance on the track is imbued with life - made evident by the non-static playing of the hi-hat. In fact, the hi-hat on the track is the most “live” element of the performance and has characteristics of current trap-beat hi-hat patterns. Clearly, other sounds were layered over the acoustic drumming track. For instance, a synthetic-sounding handclap can be heard throughout the track on beats two and four. A sound and production technique that has evolved to the point of nearly becoming common practice.

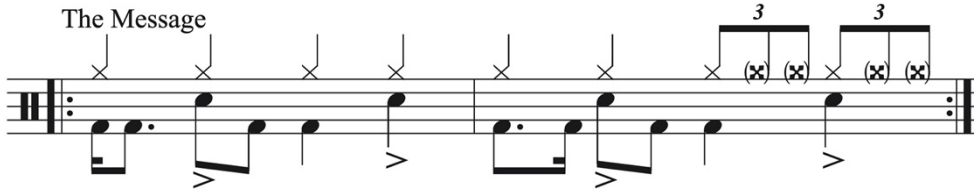

Figure 26. Excerpt: The Message - Grand Master Flash & the Furious Five

Early Influence of hip-hop DJs & Beat Producers on Drummers

As hip-hop became ever more prominent on the airwaves and in pop culture in the 1980s, the influences of the hip-hop DJ and beat producer began to show themselves in the performances of live drummers. Due to the ways in which DJs and beat producers were affecting the timbre of drumming performances via technology (turntables, mixers, drum machines, etc.), drummers began to play, tune, and affect their instruments to recreate these sounds, intentionally or otherwise.

While many of the early hip-hop recordings sampled early funk drumming recordings, there were others that sampled programmed drumming performances by artists such as Kraftwerk, Art of Noise, Tom Tom Club, Gary Numan, and Yellow Magic Orchestra. These programmed drum performances used drum machines that were cutting edge at the time and produced drum sounds that were short, articulate, punchy, and tuned in a way that many acoustic drums could not replicate without some amount of treatment or preparation.

Typical types of drum preparation at this time were crude by today's standards and born out of need and experimentation. Quite often, the preparations applied to drums were nothing more than some type of padding (folded paper towels, handkerchiefs, etc.) taped to the drumhead. Though not particularly attractive, this was an effective way of mitigating sustain and unwanted overtones produced when striking a drum. Additionally, pillows were added to bass drums to mitigate the resonance of the drum and accentuate the attack characteristics (though, to be clear, damping of the bass drum was not a new convention). The mass of the pillow (blanket, soft material, etc.) also influenced the tone produced by the bass drum. To this day, drummers will use their own proprietary methods of taming and tuning their bass drum tone and resonance by adding some amount of material to the inside of the bass drum, depending on their desired sound. Similar methods were also employed to treat the cymbal resonance. By adding a strip of tape or similar material, a cymbal's sustain could be mitigated, if not completely removed.

Complexity of Patterns

Due in large part to the proliferation of turntablism and drum programming technology in the 1980s and 1990s, drum patterns in hip-hop music began to evolve quickly - oftentimes becoming more syncopated than a live drummer could perform. Because the DJ could play two or more drum breaks simultaneously on turntables, or the beat producer could layer any number of instrumental patterns over one another in the drum machine, the resulting drum track could utilize more instruments and rhythms than a live drummer could realistically perform. However, this new level of complexity in drumming patterns proved to be a source of inspiration for many drummers.

For instance, Larry Blackmon (Cameo), Jonathan Moffett (Michael Jackson, Madonna), Omar Hakim (Madonna, Lionel Ritchie), Curt Bisquera (Morris Day, Shalamar), and Zorro (New Edition, Jodie Watley) are just a few within the multitude of drummers who were applying new rhythmic ideas to their playing beyond the typical funk drumming vocabulary. Drummers were beginning to employ dexterity that was generally relegated to drum solos or drum breaks for patterns utilized throughout a song. Most notably, hi-hat patterns evolved to become independent parts that could stand alone and have as much interest as a bass drum or snare drum pattern. Additionally, the density of the patterns often required the playing of more than the typical hi-hat or ride cymbal/bass drum/snare drum combination. For instance,

the drummer may be required to play a floor tom with (or without) the snare on beats two or four to emulate electronic sounds, or facilitate additional bell or block sounds within the context of the pattern, thus pushing the coordination and the state of the art ever further. A few examples of this type of drumming can be heard on The Talking Head's "Once in a Lifetime" (1981), The Jacksons "Shake Your Body Down" (1978), Journey's "Don't Stop Believing" (1981), Phil Collins "I Don't Care Anymore" (1982), or Duran Duran's "Hungry Like the Wolf" (1982). Also, to further give weight to the significance of the combination of the floor tom and snare drum layered sound, manufacturers are now producing floor toms with snare drum hardware, allowing the player to use either the sound of the unaffected floor tom or to engage the snare mechanism to create a snare response in conjunction with the floor tom sound. In my own output for *Analogous…* and *Hybridization,* it was common for me to play on multiple snare drums, multiple sets of hi-hats, cymbals stack, and toms while performing a drumming pattern.

When Adam Deitch was interviewed and asked what influence hip-hop music had on his drumming development, he had this to say (I3.):

> *I was that weird kid that really tried to learn how to play 3 famous drum breaks on top of each other on a Public Enemy record. A lot of the beats I know from hip hop were mixtures of two different beats, or three or four. That is hugely influential. Then you go to like drummer like Deantoni Parks. …He's a huge influence on my life. The way he interpreted drum and bass…production on a live acoustic kit has never been duplicated. And, Jojo [Mayer] has done his thing…Mark Guiliana has done his thing. But they also admit that Deantoni is the dude for that. …He's a machine on an acoustic kit.*
>
> *And, artists like Squarepusher, his album, "Feed Me Weird Things." The first track on that has a guitar sample and it's just drums that never loop. That never stopped changing. It's live samples of drums, but he's manipulating it somehow. …All the hip drummers love getting drum language from producers like that. Like Squarepusher, Ronnie Size. And I didn't stop there. I listen to Trap music that's out now. I even like Flosstradamus, Baauer, all that stuff. I'm like, "how could I apply this to the kit?" It all has its place. And now all these drummers are playing all these hip rhythms. So now people want live drummers on sessions again because the drummers know how to incorporate that. The drummers that ignore that, they're not getting called as much. There's not too many live drummers playing electronic styles…it's just a new thing, a new wave.*
>
> *I've been working for years on the on the concept of playing a groove with either hand, for instance my right so that the left hand is now a percussionist. So, you could play all*

> *kinds of bell patterns - you could play tambourines, you could hit the tom in a certain spot. And then switching and having my left hand keep time while my right hand is doing all that percussion stuff over here. It's become like a definite new coordination venture for sure. And it used to be like, "how do I get that percussion part I'm hearing in my head on top of the groove?" So, I realized that by playing the groove with one hand, it opened the other limb for all these possibilities.*

Adam Deitch's experience of trying to recreate the patterns performed by a DJ/beat producer is not unique. Many drummers have related similar experiences in which they had a hip-hop recording and wanted to learn to perform the beats contained within a track – unaware that the recorded performance was in fact an amalgamation of some number of distinct performances. This process of "reverse engineering" drum patterns from hip-hop recordings gave rise to a generation of drummers who now commonly employ a diverse range rhythmic vocabulary and instruments that was not commonplace at all until the advent of hip-hop. Furthermore, the "reverse engineering" process inspired the same drummers to affect their instruments in ways that would make them more closely emulate a produced and/or synthetic drum sound.

To be clear however, it must noted that hyper-independence and the extended techniques that may accompany the development of hyper-independence are not solely a phenomenon of "reverse engineering" multi-layered-sampled hip-hop drum beats. In fact, drummers have been pursuing and pushing the physical and technical limitations of drumming as long as humans have been drumming. Evidence of this can be heard through the timeline of recorded jazz drumming. One only need compare the drumming of early jazz drumming icons like Baby Dodds or Zutty Singleton with that of later drummers like Elvin Jones, Mike Clarke, or Tony Williams. Or, as fusion music evolved from jazz, one might consider the drumming of Terry Bozzio, Bill Bruford, Jack DeJohnette, and/or David Garibaldi – all drummers whose technical prowess and hyper-independence were evident pre-hip-hop.

Tuning of Drums/Sonic Texture

It is hard to overstate how quickly the sonic landscape of acoustic drum sounds has evolved as a direct result of DJ and beatmaker influence. Prior to the birth of hip-hop and the technologies used in its creation, drum sounds were generally "live" (as in, obviously performed by a human) and "organic" sounding (as in, the drum sounds/performances did not sound overtly electronic). Drumming performances sampled from the 1960s and 70s, though

wide ranging in their sonic qualities, had a commonness in that they could be identified as "live" via the ambience[26] of the recording, the timbre of the instruments, and the variations in the performances of the drum patterns.

Drum sounds of the 1960s tended to be much less dampened, allowing the drums to resonate freely with only a small amount of tone control applied to the drums. One need only consider popular recordings such as The Sufaris' "Wipe Out" (1963), The Who's "My Generation" (1965), Janis Joplin's "Piece of My Heart" (1969), or Barret Strong's "Money (That's What I Want) (1960) to hear this in evidence. The drums were also tuned higher - snare drums and toms were tuned in the upper range of each drum's tuning capability. This was likely due to at least two considerations: first, drummers were still influenced at this time by the drum sounds of the previous generation's drum heroes,[27] who were typically jazz drummers, and second, sound reinforcement had not yet evolved to a point where reproducing the lowest ranges of sound could be accomplished effectively and consistently. In short, drums tuned in the mid to upper range projected more easily. Additionally, there was the added benefit of the higher surface tension in a drum that was tuned higher, as it allowed for easier execution of more complicated rhythmic figures. Drum sets in this era tended to include 20" or 22" bass drum, 14" snare, and some combination of 10", 12", 13", 14" and 16" toms. The typical configuration during this time was to play bass drum, snare drum, one or two mounted toms, and one floor tom.

Drum sounds of the 1970s were (with the exception of the snare drum) typically tuned noticeably lower than those heard on recordings from the 1960s. This is due in part to advances in recording and sound reinforcement technologies, as well as drum and drumhead construction[28] processes. As popular music evolved though the 1970s with disco, funk, rock,

[26] Ambience is used here to describe the sound of the recording environment, as opposed to electronically produced drum sounds which generally lack any amount of sonic information relative to a recording environment unless otherwise added afterwards via reverb or other effects sources.

[27] Trevor Lawrence Jr: "The heroes was all the jazz… that's where that came from. It wasn't on purpose. We didn't have that name breakbeat yet - that was just jazzier cats playing on them drums adding a pocket to it" (I10.).

[28] The evolution of drum and drumhead production falls outside the scope of this document. However, it should be noted that this evolution moves in parallel to the evolution of the state of the art of drumming. As the drum

etc., drummers began to employ ever larger drums. Also, at this time, drum manufactures began to offer single-headed toms that produced short, articulate tones and could be tuned quite low without sounding distorted or "flabby," which subsequently aided live drummers in replicating the sounds produced by the DJ/beat producer.

The Layering of Sounds

The influence of production techniques and values in early hip-hop on 1980s, post-technology live drummers is arguably significant. Whether as a conscious decision or not, there is an overt and undeniable shift in the way post-technology drummers prepared their drums for performance and the rhythmic vocabulary they employed. Much of this is due in part to the way in which DJ/beat producers can layer recorded drum and sampled sounds (drum/percussion or otherwise).

The technique of layering a handclap sound on top of a snare drum sound on beats 2 and 4 persists from its origins in the late 70s and early 80s. This combination of handclap and snare drum sounds has become so ubiquitous that it is now often heard simply as the backbeat sound – and depending on whose opinion is garnered, could be a handclap or snare drum. The point is that the sound is now *just a sound* and stands alone as a unique entity. To that end, some live drummers now look for ways to either tune or augment their snare sounds in a way that more closely emulates the combined handclap and snare drum sound. So prevalent is the sound that commercial drum and cymbal manufacturers now offer products to emulate the handclap sound—products such as Istanbul Agop's "Clap Stack" cymbals and Meinl's Gen X "Drumbal." A more detailed discussion of this practice will occur in Section 6.

Other drum and percussion sounds are also frequently layered. For example, it is common in hip-hop production to utilize several bass drum sounds simultaneously. In early hip-hop recordings it was customary to layer a Roland 808 or 909 bass drum sound over the sampled drum performance to provide additional low-end frequency response. This technique has continued to evolve over time and it is now not uncommon for many bass drum sounds to be

product market has evolved to produce more effective mean of performance, so has the level of drumming performance.

used simultaneously or for verse vs. chorus options to help give nuance and variety to a recording.

The search for a way to replicate (or at least emulate) the low, "boom" Roland 808 bass drum sound is, in the live drumming community, akin to the search for the Holy Grail. Although there are many ways in which to augment or mitigate the sound of a snare drum, toms, and cymbals, there are few if any good options for changing the sound of the bass drum in the live/acoustic context without the aid of sound reinforcement. This is due to several factors. First, because the playing surface of the bass drum is vertical, applying anything to the drumhead is difficult without the use of tape or similar methods. This is not always a satisfactory solution because drummers prefer to be able to add or remove these preparations very quickly and without much effort. Second, to emulate the sound of a Roland 808 bass drum, the bass drum needs a fair amount of controlled sustain that decays evenly over a prescribed length of time. Additionally, the tone of the sustain must be low and focused. This creates something of a paradoxical situation, in that to focus the sound of an acoustic bass drum some amount of material needs to be placed in the drum or affixed to the drumhead. However, when one does prepare the drum in this way, sustain is immediately mitigated. Furthermore, the use of the low, "boom" 808 bass drum sound would happen only at selected points within the drumming pattern, not typically as the only bass drum sound. So, having the ability to employ both the 808 sound and a more typical bass drum sound in sequence would require the use of multiple bass drums or the ability to somehow engage/disengage the 808 sound at will.

Some drummers have found solutions to this problem by adding additional bass drums to their setup or by playing large floor toms as a bass drum instead of the prepared bass drum. The additional bass drum is usually quite large (perhaps a concert or marching bass drum) and tuned as low as possible before a loss of sustain occurs. When large floor toms are used as a bass drum sound, they are often prepared by affixing materials to both the top and bottom drumhead to control sustain, by placing damping materials in the drum, or by removing the bottom drumhead (if present) altogether[29]. In this way, the floor tom's sound

[29] Evidence of floor toms used as bass drum sounds can be seen in Digital Asset (R5.).

can be treated in a way that accentuates the tone while controlling the sustain[30] – although to appreciate the sound of this affected drum, sound reinforcement is often required. In my own output on the *Analogous…* and *Hybridization* recordings, two bass drums are always employed and there are instances where I use prepared floor toms to emulate synthetic bass drum sounds.

Trevor Lawrence Jr. comments on his experience of trying to accommodate multiple bass drum sounds (I10.):

> *I just realized that you got to have multiple bass drums. I always had it, even back in the day when I only had a few drums. I had jazz kit with the 18". And then I had a 22", …because 20s didn't get popular till maybe mid 90s. It was only 18", 22", and 24". 24s - that's rock guys. Now my main bass drum for records is 23". Neil Peart came up with it and…it's a perfect mix of a 22" and 24". It's got the attack…but it's still got that depth. I have everything from 16" to 26".*

The layering of sounds within hip-hop music production is nearly systemic and so common as to be ubiquitous. As such, a live drummer wishing to recreate these layered sounds must seek out or innovate solutions in order to reproduce/mimic acoustically those sounds created electronically. As Trevor Lawrence Jr. stated above, to be effective as a drummer, you must be able to produce a wide range of sounds even within the scope of a single drum type[31].

[30] There is an extensive discussion on the preparation of acoustic drums to emulate layered or affected drum sounds in Chapter 4.

[31] Evidence of my own attempts at layering bass drum sounds, both acoustic and electronic, can be seen in Digital Asset (R9.).

3: The Influence of Hip-Hop-Influenced Drum Set Artists on DJs and Beat Producers

During the summer of 2020 I was fortunate to interview a number of DJs/beat producers and hybrid drum set performers: DJ Faust (a pioneer of turntablism), DJ Shortee (high profile female DJ, educator, author), Cut Chemist [Lucas McFadden] (Jurassic 5, solo artist), KJ Sawka (Pendulum, Destroid, hybrid drummer, producer), The Hybrid Drummer [Maté Jancsovics] (YouTube hybrid drumming personality, drum set artist), Torch [Greg Sgrulloni] (drummer, producer, composer, educator, author) and Ryan Noise (producer/content creator, DJ, hybrid drummer).

There are several similarities that have emerged from each of these interviews that I believe can be extrapolated to the majority of DJs/beat producers and hybrid drummers, even though this sample size is limited. Though these artists are of varying ages and global regions, and have various musical backgrounds and influences, their similarities include: some amount of interaction with a musical instrument or musical instruction early in life, a desire to create music and sounds not available through conventional musical instruments, and a deep affinity for groove music[32].

DJ Faust:

DJ Faust is a DJ, turntablist, producer, and owns the Heavy Artillery Recordings label. His first commercial release, *Man or Myth*? (1998) was a groundbreaking tour de force in turntablism. All the sounds and beats on the record are produced by scratching and beat juggling (a process of alternating and/or combining drumming patterns from multiple vinyl records via multiple turntables and a DJ mixing console) and set a standard for what a turntablist album could be. DJ Faust's deep knowledge of the history and evolution of hip-hop, as well as the technologies that have been used in the creation of hip-hop is undoubtedly profound and thorough. He makes clear in our lengthy discussion that the art of DJ-ing and turntablism is indeed a form of instrumental musical expression – which is to say that DJs and turntablists most definitely consider themselves musicians. To that end, they are susceptible to musical influence the way any musician might be and are influenced by

[32] All interviews are listed as digital assets and are available for review via a provided web link.

drummers and recorded drum performances in particular. He also makes clear that DJs and turntablists do in fact on occasion try to mimic live drumming performances as part of their musical expression. This further underscores the reciprocal relationship between the live drummer and the technologist. When I interviewed Faust, he offered the following (I5.):

"How would you describe the evolution of funk music into hip-hop?"

> *"…Bernard Purdie and Clyde Stubblefield, … I think hip-hop is born out of, you know, "Funky Drummer." And the guy that did the "Amen" break – The Winstons. …hip-hop, it was about looping the breaks and that…repetitious loop where people would breakdance and dance. That was the…funkiest part of the record. You know, when the break came, …I think that probably gave birth to a lot of the beat making stuff in the sense that what was being tapped into was creating this like tribal-like ritual thing…"*

"How would you characterize the influence of live drumming on the DJ/beatmaker?"

> *People are trying to make it more organic again. And they do that through sampling drum breaks, you know? …Chopping up this "Amen" break…it's huge, it's been use a bazillion times…but that's [the] only way you're really going to get that human feel…that really funky drumming that sounds humanized, even if it's a loop and you're chopping it up. …I mean, there is an artistry in that. But it's very complicated there, right? …Unless you're a drummer. …They're the programmers themselves, like they're the ones that are programing it live…*
>
> *There is 'scratch drumming,' which is different. It's different than [beat] juggling and scratching. But there are folks that will, for instance, if you have a record that has drums on it and you find some drums that are close together like, [vocalizes drumbeat] …then you can…grab that and manipulate it to emulate a live drum performance. You know I can kind of bounce it around the drums to make my own beats. I'm not really sure where that came from. I just know that is a direct articulation of a DJ trying to mimic a drummer. I mean, that is it right there…*

DJ Shortee:

DJ Shortee is a DJ, turntablist, producer, educator, author, actor, and owner of Heavy Artillery Recordings and is heralded as the "World's Premier Female DJ" by The Grammy Foundation. Her musical contributions include two full length albums, countless remixes, and production credits. As a performer, she's competed and won several high-profile DJ contests, performed on many TV, commercial, and film productions, as well as at countless festivals, nightclubs, and underground raves. As an educator, DJ Shortee is currently employed with the Berklee College of Music and teaches in-person and online lessons. She also authored *Spin Now! The DJ Starter Handbook* (Hal Leonard, 2012), as well as a DVD instructional

series and an online tutorial series. DJ Shortee makes clear in our interview the connection between her instrumental background and her development as a DJ/turntablist. She also speaks to the idea of the technologist as musician, further validating the reciprocal relationship between drummers and technologists. When I spoke with DJ Shortee, she offered the following (I22.):

"What influences your DJ-ing and turntablism?"

> *I started playing drums way before I started DJ-ing. I started when I was seven. I'm a natural because of it. …You can do the same thing with scratch rudiments that you can with drum rudiments.*
>
> *I gravitate towards songs with dope beats…my favorite genre is Drum and Bass music. …But I also love music in terms of instrumentation. My favorite music is funk, soul, and jazz. Because [turntable] scratching is a percussion instrument, I just look at it as I'm a percussionist, like I play[ing] drums… scratching in particular is a just another extension, another percussion instrument….*

How would you characterize the influence of live drumming on the DJ/beatmaker?

> *I feel like [current DJ/Producers] look at production a bit differently…especially [compared to] ones from my era and prior…we're samplers. …That's how I got into production. I was sampling beats - so I would be like, 'Oh, this is a dope beat. I'm going to loop it and I'm going to flip it. I'm going to chop it up.' [Currently,] …a lot of DJs are drummers, though. …The sequencing in terms of the drum patterns is directly influenced from live drummers and from playing it. Whether you're playing on a drum machine trigger…You're a live drummer too, right?*
>
> *I love jam bands. … It's a lot like DJ-ing, …If you go to a Phish concert, for example, it's like this one long extended song where they're weaving all the…songs…and it becomes like…a DJ mix right there, mixing the whole thing together…and how they'll go from bluegrass into metal, into like funk, into like classical…, but it all makes sense. …So, from that, in terms DJ-ing, I'm being a content selector…*

KJ Sawka:

KJ Sawka is a drummer, producer, educator, and owner of Impossible Records, his private label. KJ gained notoriety as an early innovator of live Drum & Bass performance and playing a hybrid drum set – a drum set utilizing triggers, drum modules, sample pads, and/or a DAW interface. As a collaborator, KJ is a member of the Australian Drum & Bass band Pendulum and the "supergroup" Destroid with dubstep producers Excision and Downlink. As a producer, he produces drum sample packs and collaborates with developing artists and independent artists. As an educator, KJ offers online and in-person lessons in drumming and

production. KJ's comments offer insight into the role of the modern drum set artist as producer/drummer. It is common for him to curate or create bespoke drum sounds for live performance and recording situations. He is also heavily involved in the production of the beats and rhythmic accompaniment within the DAW and drum machine platforms and then recreating those patterns on his acoustic or (most often) hybrid drum setup. Sawka's comments regarding the overlap in responsibility and/or creative process regarding the live drummer versus the producer further illustrate the cyclical and reciprocal relationship between the live drummer and the hip-hop technologist (I19.).

"How would you characterize the influence of live drumming on the DJ/beatmaker?"

> *I kind of feel like a producer first and then a drummer in the concept of 'what is the song?' To me, the song is all about the hook and how it makes you feel emotionally. I teach a lot of people production. ...And I've always thought the concept of drumming is to set up the next part of the tune or sink the person in the groove. And how deep do you want to try to sink them. ...You sit them on the 'couch.' What are they supposed to do now? ...You've sunk them and now their attention is completely allow[ing] the vocal. And so that's what I try to do, whether I'm producing a drum part, playing a drum part or helping collaborate on the overall production. I'm very focused on what is the most important part of the tune. ...That is that is songwriting to me. So, I try really hard to be a part of the songwriting because I'm like, 'you wouldn't write those lyrics if [you] didn't have that beat first, you wouldn't have written that guitar part or that melody.'*

"How did you begin work as a solo, hybrid performer?"

> *When I started my solo project, it was actually DJ Sawka instead of KJ Sawka. People started thinking I was a DJ when I'd show up with a drum kit. They were confused. And at the very beginning, there wasn't a laptop, or anything. Back in the day I had one turntable and a mixer, and my drum set. And so, I'd play records, I'd play along to it and I'd try to scratch with my left hand. That was the start of me putting one stick underneath my arm, playing the beat, playing the keeping the groove alive and trying to play arrangements, you know, fills the stuff with just one hand while doing various juggling and things, so to speak, with my left. I needed to keep up the record. I needed to do some effects, turn up the high end, to do the filter, or slow down the beat and stuff. And then I had my beat machines there. So, everything was on my left side. I had nothing really on my right side that didn't need my stick. So, I always had my right-hand stick.*

Maté Jancsovics (The Hybrid Drummer):

Maté Jancsovics is a prime example of the current trend of drummer-turned-social-media-influencer. At the time this document creation, Jancsovics has over 8,000 followers on Instagram and over 5,000 subscribers on YouTube. Jancsovics drumming is a product of his

formal music conservatory education, though he is quick to point out that his formal training did not inform him stylistically as much as technically. His musical influences are largely hip-hop, Drum & Bass (and its variants), and neo-soul, though he is broadly familiar with many styles and trained in jazz. Jancsovics' comments speak to the drummer/producer relationship as well, specifically regarding the ways in which he attempts to interpret and humanize electronically produced beats (17.).

"How has post-technology drumming influenced your production/composition?"

> *"I play machine-like music and I'm also still aiming to be machine-like, I mean perfect timing and playing like that. ...I'm always…examining my playing record, I record [myself], I watch how perfect my timing is and stuff like that. But eventually when you are able to, or near almost able to play very perfect, then you can start…you can move around from that point that you have a stable foundation, and you can start stretching from there. And that's the way I'm kind of trying to humanize…electronic beats."*

"How would you characterize the influence of live drumming on the DJ/beatmaker?"

> *"The basic patterns I do by myself, which is usually the drums, the bass and maybe some melodies or something like that within the DAW. ...I really like to like to be in control of those. ...And I mostly do it by recording my beats with my hybrid kit. And I'm experimenting with some sounds or practicing some neural funk beats. And I am recording myself and then on the computer…I see if I have some other inspirations to my own beat. But they always start from the beats that I can really play live…. I never really program them before on the computer…I'm always using my own recording."*

Ryan Noise:

Ryan Noise is a DJ, turntablist, producer, hybrid drummer, and electronic instrumentalist. He is broadly capable of performing in almost any genre as he is an avid consumer of music and sound. His ability to hear, understand, and interpret music is remarkable. He possesses a unique ability to hear *through* music on many levels simultaneously – appreciating not only multiple performances but elevated levels of production detail as well. In addition to this, Ryan is also quite cerebral in his approach to and appreciation of music, its genre-specific aesthetics, and its creation. Ryan's grasp of the intrinsic relationship between the technologist and drummer (or any live musician) is well-developed and insightful. From his comments, we can see the struggle of the technologist to overcome the inherent technical limitations of working within the DAW and drum machine platforms and the technical and creative work required to make those creative efforts feel humanized (I14.).

"What limitations do you encounter as a DJ/beatmaker?"

> *OK, so we have the live instrument stuff obviously going into recordings, and as that throughput gets into the recording, live instruments or the stimulus… generator of these sounds, goes to the record, tape…which eventually becomes computers... They create the database. But, how do we grow beyond our database if you're not a musician? We can't create new compelling content because it's lacking the musicianship of the previous iterations. So how do we become storytellers now when the stories have already been rehashed? Like how do we create new things following the old ways…? And that's been a hiccup with computers and technology.*
>
> *We've been limited to this particular vocabulary; we need to get micro instead of macro. Instead of the loop or the song being sampled for the performance - how do we then get into the biology of those instruments, the sounds, the acoustics, the velocities, all of the small details, the playing styles, all of this? …There's so many aspects of it to recreate the authenticity of what was originally sampled. How does it become authentic within itself?*

"How would you characterize the influence of live drumming on the DJ/beatmaker?"

> *Technology keeps expanding so quickly, literally at this moment…like Ableton Live introducing brand new technologies into their music production suite…things like probability…. Things that people [might refer] to as a 'mess up' in classical music. …The emphasis [in classical music] was to build a performance that was…exact, being flawless [in] time, and just everything had to be exact. That's what the computers did well. Playback on that machine - quantized, perfect - same velocity, perfect duplicates.*
>
> *But, it's the weird accidents that became the new thing - the suspense in the story. It was, 'Will this happen? What is he going to do? Where will the character end up?' That mystery is what kind of created the improbability or instability - the weird things that people wanted to see live…improvisation.*
>
> *And that's what a lot of computers have missed for so long. The live improvisational thing…really is the golden nugget that the computers are missing. When you talk about computers/producers emulating musicians, where's the gold? What are we trying to isolate? Everybody is going for the improvisational, the mystery of what the computer will do next…. Rather than 'I want this exact performance performed this exact way,' we give the computer [instructions] and steer it with an eye on these things - the ability to be an imperfect human in performance within boundaries that we set. That idea of making something perfection, be it in the studio or a drum machine, has been done so many times. And our ears have been so programmed that we don't want to see flawless performance. It is almost a turnoff to people to just hear the same thing at the same volume all the time. That's so predictable.*

Greg “Torch” Sgrulonni:

Greg “Torch” Sgrulloni is a drummer, producer, author, and educator. As a drummer, he has worked with artists such as Esperanza Spaulding, Henry Walter, Dawaun Parker, Brockett Parsons, Jerry Barnes, and his band, Sistine Criminals (a live Drum & Bass/Trap/EDM band). As an author/educator, Greg published *Trap Style Drumming for the Acoustic and Hybrid Drum Set* (Hudson Music, 2018) and offers online and in-person lessons. Formally educated at the Berklee College of Music in jazz performance, he did not become enthralled with Drum & Bass until he and a friend began playing jazz standards over Drum & Bass beats. His electronic drum beat influences parallel those of many of the drummers I spoke with and include Diesel Boy, Aphex Twin, and Roni Size among others. Sgrulloni’s comments align with Noise’s comments regarding the need for improvisation (humanization) within the performance/production of electronically mediated drum patterns (I20.).

“What has influenced your programming and beat production?”

> *Jazz stuff…the reason why that's important…and just kind of the overall development of where I am today is because large a large part of what I do, whether it's Drum and Bass music or Trap music or really any kind of electronic music - the core of all of it stems from the art of improvisation. And so, before I could even get into Drum and Bass and Trap…I had to go to school and to learn how to improvise and understand what that concept even meant. So, it really started from learning and understanding jazz and developing that. And that went all the way through once I started at Berklee College of Music. …Once I got to Berkeley…pretty much I wanted to be Tony Williams, Elvin Jones and Jeff Tain Watts.*

Humanization of Drum Patterns

No discussion about the humanization of drum-machine-, sampler-, or DAW-produced beats would be worth having without the mention of James D. Yancey, more widely known as J Dilla. His nuanced, improvisational, and seemingly haphazard way of playing his Akai MPC revolutionized hardware/software-based beat production and introduced an entirely new paradigm in backbeat-oriented drum performances. Whereas prior to Dilla’s influence programmed drum patterns were hyper-accurate, quantized, metrically-perfect creations, many of Dilla’s recordings were ostensibly live performances that were seldom, if ever quantized. As such, his performances are imbued with a certain lack of precision that translates to the listener as sense of life or mystery. Any drummer that has attempted to play along with a Dilla recording can attest to the unsettling lack of metric precision – the way in

which the snare drum and hi-hat parts do not align as expected, the rushing or delay of the backbeat (sometimes within the same bar!), or the "lazy" placement of the bass drum within the pattern. Drummers that have been most heavily influenced have a colloquial term they use to describe the style of drumming that has evolved as a result of Dilla's influence: "drunk drumming." Expert purveyors in this post-Dilla style of drumming include Ahmir "Questlove" Jordan, Chris "Daddy" Dave, Deantoni Parks, Gene Coye, Justin Brown, Tony "Rico" Nichols, Mark Colenburg, and Anderson Paak. So prevalent now is this phenomenon of "drunk drumming" that there are a myriad of YouTube and other Internet resources dedicated to it, professional DVD tutorials, and primers written to describe and teach it, as well as more than a few dissertations and theses written to illuminate aspects of the micro-timing phenomenon[33].

"Lil" John Roberts is a drummer widely regarded for his ability to play authentically in many genres. A drummer since early childhood, Roberts began playing professionally at the age of 16 with Christian McBride and Joey DeFrancesco and later attended Berklee College of Music for two years before leaving to perform full-time. His list of performance and recording credits include Al Green, B.B. King, Common, Earth, Wind & Fire, Elton John, Erykah Badu, India Arie, Joss Stone, Jill Scott, Mary J. Blige, Janet Jackson, Michael Jackson, Mos Def, Paula Abdul, Patti Labelle, Prince, Queen Latifah, Quincy Jones, Sheila E., Snoop Dogg, Stevie Wonder, The Time, TLC, Al Jarreau, Marcus Miller, and Seal. Roberts's in-depth, real-world experiences allow him to contribute with undeniable authority.

John Roberts (I18.):

> *The way to J Dilla produced his beats…you know, a lot of that stuff was straight 1/8th note stuff. It's just how/where he put the swing for certain things - that the snare could have been way ahead and the kick could have been in the back, and the hi-hat could have been in the middle of all of those things. The worm-y feel of that, Ahmir [Questlove, Jordan] always referred to it as sloppy tracking. It's just stuff that's not perfect - it just is loopy, but it is still in the pocket. But it's not perfect.*

[33] Any significant discussion of J Dilla's contributions or influence would fall well outside the scope of this document. This document will limit itself to Dilla's influence on drummers who affected their playing style because of his contributions. A few notable papers discussing J Dilla's compositional style include: Peterson's "21st Century Funk: A Microtiming Analysis of the Beats of J Dilla," D'Errico's "Behind the Beat: Technical and Practical Aspects of Instrumental hip-hop Composition," Biasini's "J Dilla's Influence on Modern Drumming," and D'Errico's "Off the Grid: Instrumental hip-hop and Experimentalism After the Golden Age."

The technology currently available within the DAW and samplers has given the beat producer the freedom to create patterns of unprecedented complexity and density. However, the act of trying to humanize the patterns within the technology has had as much effect on the live drummer as the sampled or synthesized drum sounds used within those patterns. These humanized, unquantized patterns with their imperfect timing and unique rhythmic lope have inspired an entire segment of the live drumming community.

4: Hip-Hop Technologist Influence on Drum Set Artists (Mid-1990s to Current)

Regarding the performing drummer, the influence of the drum machine, sampler, and the DAW cannot be overstated. The obvious contributions to hip-hop and popular music notwithstanding, the influence these machines and software has had on the way that working drummers prepare their instruments and the way in which they play their instruments is substantial and nearly ubiquitous. Whether a drummer is aware of or directly influenced by these new technologies or not, the influence is likely present all the same. The sounds produced by these devices and software have found their way into nearly every aspect of popular music production, overtly or otherwise.

And it is easy to understand why drum machine, sampler technology took root with such ease and so quickly: the technology is small and portable, it does not require negotiating with an additional personality (i.e., the drummer), it can accommodate the creative director with an almost limitless number of sound options (even early drum machine models had more voices than a traditional drum set), it requires no formal musical instruction, and it is always accurate. To that end, as soon as it was feasible to regulate rhythm via technology[34], the proverbial genie was out of the bottle and the live drummer had to react to this new technological presence. To remain relevant, drummers had to innovate not only in terms of the sounds they were able to produce but also the rhythmic vocabulary they needed/wanted to express. This oftentimes meant approaching the instrument in heretofore unconventional ways or developing new technical possibilities on the instrument to effectively replicate what was being produced via drum machines, samplers, and/or in the DAW software. Drummers are increasingly called upon to not only recreate the complex patterns generated within the DAW and/or drum machine, but also to emulate the sounds produced by those devices and software. As such, drummers from the 1980s onwards have had to innovate new ways of approaching the drum set. These innovations have involved not only the evolution of new drumming techniques, but also the further development of ways of preparing the drum set.

[34] The advent of drumming patterns via technology had an unprecedented effect on the concept of consistent time in popular music. Having what essentially amounted to a metronome accompanying a live drummer or replacing the live drummer distilled what impeccable was and what it could mean to popular music.

Another interesting point to consider: as DJs/beatmakers began to chop and sample beats from jazz and funk breaks, the imperfections and peculiarities in the performance of rhythms became embedded within the vocabulary of hip-hop. For instance, because most, if not all, early jazz and funk recordings were recorded without the use of a click track/metronome, subtle timing anomalies that would occur in any given bar may be sampled and then looped. And if the "chopped" sample is not time stretched/compressed or quantized to account for these timing and/or rhythmic anomalies, the sample will inevitably have a certain, rhythmically unbalanced lope[35]. Over time, this phenomenon of using unquantized loops has generated its own unique aesthetic prevalent in indie and underground instrumental hip-hop and in the music of more mainstream artists such as Flying Lotus, Hiatus Kaiyote, and Robert Glasper Experiment, creating the challenge for the live drummer of recreating a perfectly imperfect groove.

A Brief Discourse on Drum Machines, Samplers, and the DAW

To give context to the later discussion on the influence that drum machines, samplers, and DAWs had on live drumming, a brief and surface-level overview of these technologies and their capabilities/limitations is prudent.

Early Drum Machines

Drum machines have existed for nearly a thousand years,[36] though they did not become electrical, circuit-based machines until the 1930s, with Léon Theremin's Rhythmicon. Even after they had become solid state electrical machines, their form factor kept them from being much more than novelty devices for performers, composers, and music enthusiasts. They were initially designed as rhythmic accompaniment devices for organists, though as they became smaller and more affordable, they were used by any musician that needed quick, easy drumming/percussion accompaniment – though essentially they were glorified metronomes. They were never intended to be used in the recording studio environment.

[35] For example: Beastie Boys, "Sure Shot" (1994), Wu-Tang Clan, "Clan In Da Front" (1993), Mos Def, "Do It Now" (1999) or De La Soul, "The Magic Number" (1989).

[36] The first documented account of a device that could be programmed by mechanical means to produce varieties of percussion patterns is found in Ismail al-Jazari's 1206 AD publication, "The Book of Knowledge of Ingenious Mechanical Devices."

Though the technology was entirely analog, these early drum machines did employ as much technical innovation as was possible at the time and showed great ingenuity. One such example is the Chamberlain Rhythmate released in 1949. This drum machine, designed for use in the home, uses prerecorded drum performances played on a tape loop. The drum machine offered users 14 different (mostly jazz oriented) drum performances, with some including additional percussion accompaniment. The controls on this drum machine are limited and allow the user to choose only between prerecorded drum performances and the speed at which those performances are played back. However, the Chamberlain Rhythmate is essentially an early form of what would become a sampler.

It was not until Robin Gibb's 1969 release of "Saved by the Bell" that a drum machine would find its way onto a well-received popular music recording (the track reached #2 on the British pop charts). The Seeburg Select-A-Rhythm was used throughout Gibb's 1969 album *Robin's Reign* and can be heard easily on the track "August October," a track that begins with the drum machine playing a waltz rhythm. Soon after, in 1971, Sly Stone released "Family Affair," which used the Maestro Rhythm King MRK-2 and charted at #1 on the Billboard Hot 100.

After Sly Stone's use of the drum machine in 1971, the use of drum machines in the U.S. was not as prevalent as it was in Europe and Japan. Bands like Can, Kraftwerk, Kingdom Come, Osamu Kitajima, and Yellow Magic Orchestra all had successes using drum machines like the Ace Tone Rhythm Ace FR-1, Bentley Rhythm Ace FR-6, and the Maestro Rhythm King. There were several other notable drum machines used significantly during the 1970s. These included Eko ComputeRhythm, Ace Tone Rhythm Producer, Roland CR-78, and Boss DR-55.

From Roland[37]:

> *Launched in 1978, the CompuRhythm CR-78 was Roland's first drum machine that created and stored patterns. Even though it was meant as a rhythm accompaniment device for organs—hence the abundance of waltz and bossa nova patterns—it became*

[37] https://www.roland.com/us/promos/roland_tr-808/

fairly popular with established musicians, including Phil Collins who used it several years later on 'In the Air Tonight'.

It wasn't until Roger Linn released the Linn LM-1 in 1980 that a drum machine employed digital sampling. This was a departure from synthesis-based drum machines that employed white noise bursts (for snare drum sounds) and sine waves (for bass drum and tonal drums) to create representations of acoustic drums sounds. The Linn LM-1 used digital sampling, which is to say it played back 8-bit digital recordings of drums rather than generating approximations of drum sounds via synthesis. Though a monumental leap forward in drum machine technology, these 8-bit sampled drum sounds remained still in the realm of a "synthetic" sound, primarily due to the limited processing power of the Linn LM-1. However, the Linn LM-1 was used to great effect during the early 1980s by act such as Phil Collins, Vangelis, Human League, Stevie Wonder, Gary Numan, Depeche Mode, Icehouse, Devo, Kraftwerk, Herbie Hancock, Peter Gabriel, The Art of Noise, Michael Jackson, and Prince.

The Linn-LM-1 was a leap forward for other reasons beyond its digitally sampled sounds. It features several programming and performance options that had never existed in a single drum machine unit prior to its development but would be included in nearly every other unit to be produced going forward. For example, the individual samples could be tuned to accommodate the composer's aesthetic ideals, quantize and shuffle/swing functions could be applied to recorded/programmed patterns, and outputs for each drum sound could be mixed and routed from the console to external effects and/or multi-track recording devices. Though the unit could not be triggered from an external source via MIDI, like previous drum machines could, this device garnered instant popularity. Roger Linn describes the impetus for the LM-1:

We're all trying to find the correct balance between technological assistance and human skill. In our search, I think sometimes we're going too far in the direction of letting technology replace human skill. Some people prefer to spend weeks programming in every detailed nuance of a great instrumental solo, rather than taking the time to practice and develop more performance skills.

Before working with Leon [Russell], I had rejected drum machines as low-quality add-ons in home organs. Leon introduced me to the idea of using the primitive drum machines of the day in recordings, which kept the tempo steady and therefore permitted even the drummer's track to be replaced if needed. It sparked my interest in finding a solution to the problems of 1) the lack of programmability and 2) the poor sound quality.

After Roger Linn introduced the LM-1 in 1980, Oberheim quickly followed suit with the DMX. This drum machine also used digital samples and had many of the functions available within the LM-1. The DMX additionally offered users the ability to sync the drum machine with other external devices via Oberheim's proprietary bussing system and MIDI on subsequent iterations. It also added the ability to play rolls, flams, and other drum-specific sounds at the push of a button. The DMX was a favorite among artists/bands in the early 80s, particularly those in early hip-hop, including Run DMC, Prince, Davy DMX, Roni Size, Kurtis Blow, Thompson Twins, New Order, Madonna, Phil Collins, Stevie Nicks, DMX, and Herbie Hancock. So popular was the DMX within hip-hop culture that several artists have included DMX as part of (or as) their performance identity.

After the release of the LM-1 and the DMX, there were a number of other products that were brought to the commercial market with varying degrees of success. These include the Sequential Circuits DrumTraks, the E-mu Systems Drumulator, and the Yamaha RX11. But none of these would reach the ultimate commercial popularity of Roland's TR-808, which was also released in 1980. Though initially met with lukewarm enthusiasm in the wake of drum machines that use sampled drum sounds, the TR-808 would develop a cult-like devotion in the decade to come and end up on countless recordings by artists/bands such as Beastie Boys, Afrika Bambaataa, Public Enemy, Aphex Twin, Usher, Whitney Houston, Beyonce, T La Rock, New Order, Talking Heads, Daft Punk, Marvin Gaye, Genesis, Kanye West, Pet Shop Boys, Phil Collins, Run DMC, and LL Cool J.

> *Drum Machines – the easiest and cheapest source of drum sounds – were the seminal rap axe. By general consensus, the Roland TR-808 was the instrument of choice, mainly because of its bass drum. "The 808 is great because of the bass drum," Kurtis Blow reports. "You can detune it and get this low-frequency hum. It's a car speaker destroyer. That's what we try to do as rap producers – break car speakers and house speakers and boom boxes. And the 808 does it. It's African music!"* (Théberge, 1997)

From Roland[38]:

> *The goal for the new machine, now called the TR-808, was to include realistic-sounding drums. Memory chips (needed to play back sampled recordings of 'real' drum sounds) were too expensive, so the engineers used analog synthesis to recreate the sounds—initially on Roland's System-700 modular system before recreating the parameters on the TR-808's analog circuitry. Although a simple choice born of necessity, choosing*

[38] https://www.roland.com/us/promos/roland_tr-808/

analog over digital technology would have a profound impact on music in the years to come.

Since the 808 sound was analog, many tonal adjustments were possible—less sizzle in the hi-hats, extra snappiness in the snare and, critically, more punch in the kick drum. Being able to extend the decay of the kick drum to reveal more of that warm analog tone, gave the TR-808 something very special indeed—the power to make people move. Much to the "delight" of speaker manufacturers, a cranked-up 808 track would regularly blow out speaker cones.

In 1983, Roland released the TR-909, a drum machine that featured synthesized as well as sampled drum sounds. It also introduced MIDI capabilities within the unit, allowing for the unit to be triggered by external devices. Like the TR-808, the TR-909 had lackluster commercial success until it found its way into secondhand markets. There, like the TR-808, it found a cult-like status, helping to give rise to House, Techno, and Acid music styles. The market began to become saturated with drum machines in this period, with products such as the Alesis HR-16/HR-16B, Korg DDD-5, E-mu SP-12, Roland TR-707, R-8, Electro Harmonix DRM 32, and Yamaha RX-5.

The Sampler

In 1988, a watershed moment occurred with the release of the Akai MPC60 (MPC = MIDI Production Center). After the demise of Roger Linn's business, Linn Electronics, in 1986, Akia sought out Linn to be the creative force in developing Akai's fledgling Akai Professional electronic instruments. It was a fruitful union that allowed Linn to focus on what he loved, building creative, intuitive electronic music instruments, and avoid that which he despised, the financial and marketing side of the business.

The Akai MP60 was all that Linn's previous drum machines had hoped to be. It provided the user with 16 touch sensitive pads for performing patterns (a form factor reminiscent of the LinnDrum MidiStudio), sampling capabilities, a MIDI sequencer, record function, loop function, and a stable operating system (the Linn products, though innovative, were notorious for OS issues and crashing). The sampler recorded short 12-bit, 40kHz samples which could be assigned to individual pads and played back or sequenced as desired. So effective was the MPC60 at being all things necessary for beat and music creation that it soon became *the* drum machine/sampler/workstation most used within the hip-hop, Rap, and R&B production communities. Artists/bands such as DJ Shadow, Warren G, DJ Premier, Dr. Dre, Outkast, Big

Boi, Gang Star, Prince Paul, Jermaine Dupri, Aphex Twin, Jean Michel Jarre, De La Soul, Marley Marl, Beatie Boys, Public Enemy, The Dust Bothers, and most famously, J Dilla all used the Akai MP60 to great effect.

Roger Linn comments,

> *It was a phenomenon that we never expected, … That people would do this, what I call object-oriented composition or OOC, which is where instead of composing and playing all the notes yourself, you play some of the notes, but for other sections you'll just take a section from a recording where someone had already gone through the trouble of playing those pesky notes* (Russle, James. "Music tech legend Roger Linn:…" *MusicRadar.com,* 3 July 2019, https://www.musicradar.com/news/music-tech-legend-roger-linn-i-rarely-listen-to-anything-with-drum-machines-in-it. Accessed August 2019.)

After the release of the Akai MPC60, Akai released subsequent models with ever-more functionality. Akai has released 20 subsequent MPC models, beginning with the MPC60II in 1991 and extending to the current MPC Live II, released in 2020. No other device of this type has been so prevalent in the music production studio. Of course, there are similar devices on the market, each with its own unique development of what the MPC products have brought to bear. And there is a certain amount of back-and-forth between Akai's MPC innovations and those its competitors bring to fruition. However, the differences in functionality that exist between the MPC products and other related products, released by companies such as Roland, Boss, Alesis, Korg, Native Instruments, all draw on the form factor established by the original MPC60. The concept of providing the user with touch sensitive pads (many using the Akai 4 x 4 pad grid), sample editing, record/loop functions, mixing, and routing capabilities like those found on the first MPC60 are still in use by all sampler devices today.

DAW Technology

The DAW, or Digital Audio Workstation, is a computer software platform that offers the user the ability to record, mix, and edit audio and MIDI information that has been imported or captured within the DAW. This innovation has made the use of analog mixing consoles, outboard effects processors, and external recording devices all but obsolete, with these capabilities now being offered within the DAW itself. Furthermore, the user-friendly GUIs (graphical user interface) that have evolved along with DAW technology have made it

possible for amateur users of pro-audio or those with limited recording knowledge to effectively capture, mix, and edit audio and MIDI.

Whereas in the earlier analog generations of audio recording production one had to have a broad knowledge base to effectively operate a multitude of complicated audio devices that may be routed together though a sizable number of audio connections, the DAW now allows for the user to simply open the software and "point and click" their way through audio production. And, because DAW audio editing is non-destructive (one can always use the "Edit Undo" function), the risks of losing or damaging captured audio is minimal, allowing novice users to safely "tinker" with all available audio processing/editing capabilities within the DAW. The advent of the DAW has given rise to the now ubiquitous "bedroom producer." Anyone with a powerful enough computer and access to DAW software can begin producing audio at a remarkably high standard given enough time, knowledge, and talent.

The advent of DAW technology has had far reaching effects; it has completely upended the recording studio industry, inspired the rise of boutique software creators, given everyone the potential to record at a remarkably high level, and forced a generation of musicians and recordists to become technologically proficient in order to remain relevant. Furthermore, advancements in DAW technology have allowed the DAW to, in essence, become another member of the performing ensemble in some instances, much in the same way Sir George Martin is often considered the "fifth Beatle."

The MIDI (musical instrument digital interface) protocol emerged in 1983, ushering in a completely new way to play, sequence, and record music, digitally. The MIDI protocol allowed musical devices equipped with the proper connectivity the ability to transmit musical data between devices such as keyboards, drum machines, sequencers, tone generators, and computers. Originally, MIDI information was transmitted solely via a proprietary 5-pin DIN cable, but has now moved to the more ubiquitous USB A/B-type connector. Early DAW technology was intended to make the most of this new interconnectivity between the multitude of audio devices that could be linked together by centralizing control of them within the DAW.

Due to the technical limitations in computer storage and processing power when DAW technology first appeared commercially in 1985 with Steinberg's Pro-16 platform, the DAW

was only capable of recording and sequencing MIDI information on a single operating system, the Commodore 64. In 1986, Steinberg's Pro-24 was released for the Atari ST (the first PC to feature built-in MIDI in/out ports), but it was still only a MIDI-recording, step-sequencing, and editing platform. It did, however, provide the user with scoring (notation) options, quantization, and the ability to edit a multitude of MIDI parameters.

As memory and processing power advanced exponentially through the next decade, the DAW market would see corresponding advances in technical abilities – most notably the ability to record and edit multitrack audio as well as MIDI. In 1989, Digidesign released Sound Tools, a computer-based stereo digital audio recorder/editor (no MIDI), and a year later Opcode released Studio Vision, which incorporated both stereo audio *and* MIDI recording/editing. In 1991, Digidesign released Pro Tools, the successor to Sound Tools, which allowed for the simultaneous recording of four audio tracks. It was at this point that the digital recording revolution and numbers of additional DAW software titles emerged. Further iterations of Digidesign's Pro Tools and Steinberg's Cubase, as well as MOTU's Digital Performer and Emagic's Notator Logic (which was later purchased by Apple and sold as Logic, their proprietary DAW software), became important innovators in the DAW market. Prior to 1993, nearly all DAW software utilized the Mac, Atari, or Commodore operating systems.

In 1996, Steinburg again revolutionized the DAW industry with the advent of VST (virtual studio technology) plugins. VST technology allowed the user to affect or play sound in real time, within the DAW, without routing audio to external hardware, such as tone generators, drum machines, compressors, reverbs, etc. This led to changes in the way in which a DAW may be employed. Whereas initially DAW software was intended to be used as a recording and editing platform, with the advent of VSTs, virtual instruments could now be played or programmed within the DAW, allowing the user to create completely from within the DAW itself. Today, there is absolutely no limit to what a DAW might achieve for a music creator. The ability to perform, record, edit, and even notate music from within the DAW is commonplace.

DAW technology has progressed to a point where users are now able to create and edit audio much in the same way that a graphic designer can alter a photo in Photoshop. Almost every nuance of a sound or performance can be altered or manipulated within the DAW. Imperfections in tuning, pitch accuracy, tone, timing, and dynamics can all be "fixed" within

the DAW. Furthermore, those creating/composing within the DAW need no formal music instruction, but rather only access to sounds, loops, or MIDI content. A proficient user of the DAW can then instruct the DAW to align all the disparate information in terms of key, tempo, metric feel, etc. Additionally, the user can instruct the DAW to compose melodies, harmonies, and rhythmic patterns, and perform them in seemingly lifelike ways by programming parameters, employing randomization effects, and automating dynamics.

Currently, most DAW platforms can and do perform the same multitude of audio and MIDI tasks. Though there are certainly DAW platforms designed for the amateur and those designed for professional use, the sound quality produced by all DAWs is the same due to the digital nature in which the audio is processed within the DAW. Any differences in sound production will be a result of the user's knowledge and talent, audio converters located within the audio interface or computer soundcard, pre-amps (or other frontend audio applied before the audio reaches the DAW), microphones, musical performance, instruments used, and the acoustic environment in which the performance is captured. In short, the DAW is an amazing technological innovation, but it alone cannot and will not supplant the need for knowledgeable audio engineers, audio producers, or quality musical performances played on good-sounding instruments in live music-recording situations.

Complexity of Patterns

Due in part to the ease with which ornate and complex drumming patterns are created within the DAW and drum machine, and the ways in which some beatmakers are playing drum machines like the Akai MPC as an instrument without quantization,[39] contemporary drummers are tasked with recreating this rhythmic vocabulary, which oftentimes is either beyond the scope of human performance or beyond the scope of what a drummer might consider consistent musical time. As such, new techniques and ways of conceptualizing musical time are required.

[39] The hip-hop producer J Dilla is widely regarded as a pioneer in the humanizing of the hip-hop drum loop due to the way in which he played the Akai MPC as a musical instrument. There are many scholarly sources devoted to J Dilla's contributions as a producer and MPC performance innovator.

Ahmir “Questlove” Jordan states in his text *Mo’ Meta Blues* (2015),

> *I have spent years learning to become a perfect, meticulous drum machine, but now I wanted to go in the direction I thought music was going… There’s an option on drum machines that lets you quantize them, program the drum sounds so that they sound right… Suddenly some artists were switching that off, and their drums would sound strange at first, but then warmer and better. Real drummers slow down. They speed up. There’re different dynamics at different times. Very few artists understood that.*

Trevor Lawrence Jr. (I10.):

> *I think that originally we were dealing with the drum machines…and there was a certain sound we had…until the late 90s. But when Dilla came around, that's when it changed. Dilla was the modern fusion…he's the godfather of modern hip-hop. He's the one that fused modern jazz and hip-hop. …When Dilla came his he brought this soul to it. …He was the Miles Davis of the s***. …Dilla is the one that brought it to where it is today. Now drummers are playing basically everything you're hearing [from] Dilla. Even with Chris [Dave],… it’s what made Chris famous? That's all Dilla feel. …That's what all the drumming is….they're attempting to play like Chris, which is a direct influence of Dilla.*

“How do you recreate dense and/or intricate drum patterns created within a DAW?”

> *It's real simple. You do an interpretation or if you want to do it literally - you just overdub. I mean, there's only two ways you can do it. But live, you're having all these things that you're playing on top of. So, you have to learn how to lock in too because you might be hearing…dialog, sound effects, explosions, one beat transitions, different tempos. You've got to be able to focus… that's the real test. When you have to play with something that's not right and adjust to it. When you [play] to a track and it's not really there, it's not on, or somebody who's…not in pocket with their bass or their guitar tracks…or the loops are not quantized with any feel…it sucks.*

Daru Jones is the quintessential beat minimalist. He is also on the forefront of playing prepared drums and interpreting the Dilla feel. Jones’ performing and recording credits include Jack White, Pete Rock, Gloria Gaynor, Slum Village, Talib Kweli, Dwight Yoakam, Nas, Pee Wee Ellis, Queen Latifa, Black Milk, Pharoahe Monch, Black Sheep, Diggable Planets, Q-Tip, Mos Def, and Raekwon.

Daru Jones (I8.):

> *In addition to playing live drums, I also gigged on drum machine. When I first started playing gigs, I was trying to play like a drummer on the drum machine. But then when I started producing and composing music, I noticed that …(I was listening to a lot of hip-hop producers…like RZA from Wu Tang Clan and Dr. Dre,…The Bomb Squad…and Eric Sermon, and Pete Rock),…all those producers, …at the time, they had*

this pocket. That's something that I learned in church too. I just noticed that it was very simplistic…I don't need to do much.

John Roberts (I18.):

> *I mean, there's only certain things that you your limbs can do. …Like if there's a kick pattern, for instance, that's really complicated. And I know I can't do it with one foot. I'm pulling up two pedals. I'm not going to act like, 'Oh, I'm Little John. I should be able to play this one foot.' I am not egotistical like that. I'm gonna find the best way to pull that song off. However, whatever I need to do it. …If I need to have two hi-hats on one side over here, one over here to make it sound like a different thing, like the record sounds…I'll put two hi-hats up. …I'm thinking, what's the best way that I could pull this off and it not sound…sterile but it sounds like the like the track…just lock it, pound it hard. It is coming through the whole stadium…it's strong. …And if it's a challenge, I'll just go and shed my ass off with it. Whatever it takes for me to pull it off. And if it's something that I really can't pull off, …an intricate part that I know I can't play humanly - we'll just…put it in the box with in ProTools. …And I'll play along to it and just let that be the push, the drive of the track. I'll play on top of it and add whatever I need to add to it and make it better live…*

There are many contemporary drummers who have pushed and continue to push the technical limitations of what can be accomplished with only two hands and two feet. Drummers like Jojo Mayer, Benny Greb, Johnny Rabb, Marco Minnemann, and Thomas Lang, to name just a select few, have redefined what is possible on an acoustic drum set. Their hyper-developed technical prowess has enabled them to recreate patterns programmed within the DAW or drum machine to such a degree that the audible differences are near absent or negligible at most[40]. These drummers have pioneered advances in drumming techniques and then made them available to a global audience through their educational materials, clinics and masterclasses, and recordings, thus informing and inspiring future drumming technique masters and innovators. Some of the "newer" drummers making significant contributions (though "newer" is relative and subjective) include Richard Spaven (José James, Flying Lotus), Chris Dave (D'Angelo, Robert Glasper, Meshell Ndegeocello), Perrin Moss (Hiatus Kaiyote) Mark Colenburg (Robert Glasper Experiment), Louis Cole (Knower), and JD Beck (Domi & JD Beck).

[40] Jojo Mayer, "Secret Weapons for the Modern Drummer," Benny Greb, "The Art and Science of Goove," Johnny Rabb, "Jungle/Drum & Bass for the Acoustic Drum Set," Marco Minneman, "Extreme Drumming," Thomas Lang, "Creative Coordination & Advanced Foot Technique."

“How did you make the transition from playing in conventional instrumental styles to those in electronic music?”

Greg “Torch” Sgrulloni (I20.):

> *I met a saxophone player, Erin Burnette (who plays for artists like Esperanza Spaulding) and he introduced me to electronic music. We happened to get together one day and just have a little duo kind of jam session. And we're starting off by swinging. But then he stops and he's like, ‘Can you play a drum and bass beat?’ And I had no clue what he was talking about. I said, ‘Sure, you mean like drums and bass? There's no bass player here!’ He told me, ‘Basically what it is, it's like a James Brown funk beat, but sped up.’ Well, I've heard my fair share of James Brown funk. So, I'll just make an attempt. That's kind of like the start of my journey in getting into and exploring electronic music on drums. The concept at first was taking jazz songs and just Drum and Bass-ifying them, essentially. So that connection from the jazz world into electronic music really kind of met there. ...I was really intrigued by the inhuman nature of what I was hearing.*

“What are your influences for creating electronic music on the drum set?”

> *I probably did the thing - I don't know if this would be controversial, but I made it a point not to listen to drummers - live drummers. Because to me, one of one of the pieces of vocabulary of electronic music is the fact that its sample based, loop-based music. And when it comes to Trap music, that's all programed. So that's obviously getting into different territory. In the beginning, it starts off as a live drummer, but then then it hits the DJ and the producer and how they manipulate that sample. I think it's important to know the history. And I think it's important to know the guys that did it and try to play that. But in the end, that's still funk and that's still like gospel or whatever. But the way that it transformed, that's when it turns into something else.*
>
> *So rather than going all the way back to the source, stepping through all these pieces, I’m like, ‘Let me just pick it up here where it's already sort of realized.’ There's all the other elements surrounding just the drum part that makes up that overall sound and how that producer or DJ relates all those sounds and those textures to the groove itself. That's a style. That's a genre all its own. So, I started listening to Diesel Boy mixes and then I started getting into Squarepusher and Venetian Snares and Ronnie Size and New tone. All of all of those. It was just about ‘how can I sound like that on my drums?’*

“What challenges you as a live drummer playing electronic-based music?”

> *...I call them tendencies,...your tendencies as a drummer - things that you would do as a drummer. If you listen to [electronic] styles of music, it's…almost robotic and loopy and it's not the same. The behavior is not the same thing. A drummer would have the tendency to do a lot of drum fills, for instance. But if you listen to a track by Caliber, it'll be five minutes of just a dance beat. And you have to fight yourself, not to play a fill.*

“How have you developed your electronic music vocabulary?”

> *To really understand it, I need to be listening to it for hours every day because you're going to pick up so many things - little things. I need to really understand everything about this song. I didn't just do a [single] listen, it was probably like hundreds and hundreds and hundreds of passes of listening to that song. Then I would pick up like phrases - different blocks of phrases. Those would be my vocabulary words, so to speak. And rather than playing it note for note, like verbatim kind of thing - I’m improvising. I want to know the language behind that song rather than just playing it down like a classical piece of music. I enjoy the freedom of being able to interpret and just create my own version while also trying my best to do that song justice.*

Tuning of Drums/Sonic Textures

As previously stated, the act of preparing the drum set for performance in a live or studio context is certainly not new. What was new with the advent of drum machine, sampler, and DAW technologies, however, was the act of preparing the drum set as a convention. Whereas in previous decades preparing the drum set might have been a necessity in order to dampen overtones or resonance, since the advent of these technologies, drummers are making a conscious decision to alter the sounds coming from their instruments as a way of emulating the produced or processed sounds of recorded, sampled, or programmed drumming performances.

Rob Turner is the drummer for GoGo Penguin, a band that plays EDM-influenced jazz. The band is a trio comprised of piano, double bass, and drums, and is currently attached to the Blue Note label. Turner’s drumming is an eclectic hybridization of jazz and Drum & Bass styles, and he is authoritative in his knowledge and performance of both styles. However, his blending of the two styles is what creates his unique sound and performance aesthetic. Additionally, Turner is also one who regularly applies materials to his instrument in order to created affected sounds.

Rob Turner (I23.):

> *To emulate the way the ride cymbal sound gets chopped at the end of one breakbeat, moving into another breakbeat, I’ll put the ride cymbal on a remote hi-hat stand using the hi-hat clutch, and then put some plastic, padding, or another hi-hat cymbal under the ride. Then, I’m able to stop the sound of the ride cymbal as I would the sound of an open hi-hat by operating the hi-hat pedal. This gives the effect of a ride cymbal sound being chopped by a sampler. Only Adam Betts (Squarepusher and Colossal Squid) and I do this currently, so don’t steal it!*

Greg “Torch” Sgrulloni (I20.):

> *Consider how producers/DJs end up manipulating samples …The byproduct of taking an original tempo funk break and then speeding it up is that the pitch goes up. I definitely needed to doctor up my drums to emulate that sound. And I still have to do that…I still have to figure out new ways. And, the drum types you use - so rather than using your standard 14-inch snare drum, I'm going to go with like a 13-inch piccolo and I'm going to crank it up [and] I have my wallet sitting on the side. …You do kind of start thinking in terms of production.*

Trevor Lawrence Jr. (I10.):

> *I don't think we've spent enough time dealing with the effects of sound vs. feel. ...I think that we get too tied into what somebody is playing…. Sound and drums got crazy in the late 80s because you saw the piccolo come to fruition. You saw Weckl bring the eight-inch tom and the splash to fruition. And the gospel…drummers adopted it. [They] didn't really know where they got it from, but adopted that. Nobody was playing 8-inch toms and splashes with those phrasings before Dave Weckl anywhere in commercial anything. ...Then you noticed that in the 90s we got to this 'tight' thing. ...We had the 13-inch hi-hats came out – Peter Erskine was the first person to have a dry ride, a super extra dry ride, that came out in the late 80s actually. But the 90s, we went to the piccolo, then Weckl came with the 13[-inch snare]. We were like 'Oh, my God! A 13?!' Then a 12[-inch snare]! The drums started getting all small.*
>
> *Why is that? Because people started realizing that to compete with this music in the 80s, we can't have a big old snare drum sound anymore. We've got to have a smaller snare drum sound 'cause drum machines are 'cracking!' Which very well was probably originally back in the day a sample of James Brown that's been…mutated millions of times. I think the sound really is almost more important than what you're playing. The sound to me is what dictated the time. ...I was realizing in the studio [that] to achieve a lot of these sounds, it's got to go the other way…the drums gotta be smaller so you can achieve some of these [electronic] sounds. It's a cycle. We're trying to chase the drum machine, that's a sample of a human (once upon a time). ...It's a big 360 cause it started with a human, got put in the drum machine…now we're humans trying to chase the drum machine that was originally a human. I mean, that's the absolute fact.*

Adam Deitch (I3.):

> *Jungle is based off a famous drum break, the "Amen" break by the Winstons from their track "Amen Brother." That was just a funky break - about 102 -105 BPM or maybe, about 110. And then it was sped up to about 160 - all the way to like 200. And so that's part of the treatment. How many different tunings have I heard the Funky Drummer - sampled and sped up, slowed down? Zigaboo's beats and Purdy's beats and all that stuff. Treating drums is a huge part of hip hop and maintaining the grit of it. Because in the 80s, you had Whitney Houston, you had Madonna and all of those drum sounds were clean and hip hop was the antithesis to that. What about those dusty records with the record scratch in it? You know, you could hear the record spinning and it just had like a vibe. And it's a nostalgic feeling that you get from hearing these records. So,*

tuning the drums is a huge part of it. And treating the drums and making them dirty is a huge part of it.

Daru Jones (I8.):

I don't really want to give all of secrets away, but…some of my tuning is like if I was to have a percussionist play with me. …I want to have drums with a percussion overtone on top because the percussion sounds are a lot of bell-y, like high-end sounds…so it's kind of like a mish[mash].

John Roberts (I18.):

I mean, early [hip-hop] made me change the way I tune my snare. Coming up in church, we always tuned our snare really high. That was the church sound for us back then…the gospel sound was a high snare. It had to cut through everything. And as I got older, I started tuning my snare down more. You know, I started to hear other records and some stuff was real flat…with a lot of muffling on it. There was no extra overtone to the snares…they really cut straight though like, compressed on their own. Like what an engineer would try to do to you if you were in a studio and a snare is ringing too much, they would put a gate on it or compress it really hard.

Back then it was more…black tape, or we used to put the cloth on top of the head or…I had a big old piece of towel inside the snare - I would put the head on top and the tighten it. And now, we've graduated to having MoonGels,…Drumdots and all this stuff is out now. And now we've got Big Fat Snare Drum…all you gotta do is put that on the top of the snare and then it sounds like a big, heavy snare drum.

As I got older to my kick drum sounds changed. We started taking the front head off because we wanted more of the inside of the kick drum with just the pillow…because James Brown and them, they didn't have front heads on the bass drums. Sly and the Family Stone and a lot of those funk bands back then…that's why those kicks sound so tight - because they didn't have a front head on them. They just had the pillow, and the mic went right in there.

And perhaps in a more contemporary context, drummers who compose via technological means (in a drum machine or DAW setup) will often try and find ways to affect their acoustic instruments to emulate the sounds available and the patterns created within their creative technologies. In particular, Rob Turner discusses the preproduction processes that the band worked out so as to recreate live effects that they were able to create within the DAW - effects like beat repeat and tempo-based delay.

Rob Turner (I23.):

So, like the breakbeat thing is really interesting. Like when I watch JoJo Mayer, he's got a really sick breakbeat he's worked out. His breakbeat is amazing. But he's not actually composing one, he's doing them. He's just shuffling patterns.

It's like the way the sampler cuts the loop and the way it re-triggers it, and where it's re-triggering it from. When you listen to Jungle, you've got the little notes in between - they come from two different places in the break. So, if you don't get them right, it doesn't sound like Jungle – it sounds like a drummer doing Jungle. [Demonstrates triggering breakbeat on sampler within a DAW]

If you can learn to do that as a compositional device, but then add to that with all of your beats, because that's what Four Tet is doing, he's cutting the beat, splicing it in different places to make new beats. You could do this with your bossa nova, or anything - you should be able trigger it from a point in the bar and then you can use it as a method of improvising. You can learn to frame your beats as you're playing, and you can improvise and join things together. You've subdivided everything, and taking a break, imagining how somebody would have subdivided it on a on a grid-based trigger system, and then able to recall any of that. It's actually really aesthetically clear.

I've done it because I like that, and I just really like Aphex [Twin], so it's like 'How does Aphex make beats?' If you want your beat to sound that way, that's what you've got to do. You just got to be able to do it on your kit, and you got to be…frustratingly nerdy and anal about where you're hitting the drums. If you move your stick, if you've got indie technique, it won't sound right - you won't be able to control it. Every time the hi-hat opens, it's got to open in exactly the same way – or else you won't have a consistency of sound…that sort of artificial esthetic. You never really achieve it [the computerized aesthetic], but you can get pretty close. But that's sort of the art of it too. Those slight, tiny little imperfections which humanize it, make it that much more substantial than its initial computerized inspiration point. And then after that, it's plugins.

To that end, it has become commonplace to find contemporary drummers, both professional and amateur, utilizing prepared drums and cymbals not only as a way of recreating produced drum sounds, but also as an extension to the typical acoustic drum set sound palate. The use of stacked cymbals, varieties of mutes on drums, additional snare drums tuned in the extreme low and/or high ranges, cymbals and other metallic materials applied to drums, and new hybrid acoustic instruments that function only as a non-descript sound source (such as those from manufacturers like Keplinger Drums, Bald Man Percussion, Morfbeats, and Stack Ring Percussion) have all become common in the contemporary drummer's setup.

Adam Deitch (I3.):

> *Well, it's [about] originality and trying to have your own sound. And Chris Dave was one of the first guys throwing a lot of stuff on his kit - rattles,…walnut shells on his hi-hat - tons of stacks - like taking a bunch of old cymbals and putting them on top of each other. The goal is to really have your own sound. In hip-hop, you can't avoid the percussion element - it's not just kick, snare, and hat. There's things in there - bells and other sounds that are part of the beat. So, we add all these things to the kit. You're creating a hybrid sound of percussion and drums. Whereas for years it was separated. It was like, 'you do the drums, I do percussion - and we put it together.' Well, what if we don't have a great percussionist that's tasty and does that one bell hit that one right spot? You should do it yourself!*

The tuning of drums in the contemporary context is not easily described, as the tuning options available are as varied as the derivatives of Funk and hip-hop music themselves. Furthermore, due to the myriad of homemade and aftermarket applications available for altering a drum's sound, the tuning of a drum—other than its relative highness or lowness relative to the drum sounds generally identified with a particular genre—seems to be rather an afterthought. However, what can be said about drum sounds in hip-hop influenced funk styles of drumming is that they tend to be quite dry. This is achieved by means of affecting the drum's resonance with damping materials. Also, the snare and bass drum sounds need to be distinctive.

Trevor Lawrence Jr. (I10.):

> *I'm endorsed by Big Fat Snare Drum, it's brilliant. …That's the smartest thing I've seen because it allows you to have one snare drum and get 20 sounds. …Even if you have a piccolo, you can make it sound like a bigger drum. I feel like the snare drum is really the thing. I mean, obviously, the snare drum and the kick drum. But if you have one thing that you really could change to make a dramatic impact on a music, it's gonna be a snare drum sound.*
>
> *Now I travel with my case of all overlay…like hundreds of things travels in a square snare case. And that's what comes with me everywhere. So, there's every overlay that they make for Big Fat Snare…and all these things I've collected over the years for muffling snare drums or whatever.*

Layering of Sounds

Again, due to the way in which drum patterns are created within the DAW and drum machine or on two turntables by a DJ, it is quite easy for there to occur the simultaneous performance of multiple snare drum, bass drum, or any other percussion sounds. As a result, it is often necessary for the drummer to facilitate a way in which to make multiple sounds occur simultaneously, beyond the scope of the usual multitasking associated with drumming. This

can be achieved in two ways: either by applying some material or object to a drum so that it sounds like more than one instrument or by playing a conventional drum or cymbal and another unconventional sound such as a cymbal stack at once. Though this practice is not wholly unique to modern drum set performance, it is certainly more prevalent now than ever before.

Allison Miller is a drummer most notable for her performance and recording credits with Ani DeFranco, Natalie Merchant, Erin McKeown, Marty Ehrlich, Dr. Lonnie Smith, Brandi Carlile, and her own bands, Glitter Wolf, Boom Tic Boom, and Honey Ear Trio. Formally educated in percussion performance at West Virginia University, she was later mentored by drumming greats Michael Carvin (Freddie Hubbard, Dizzy Gillespie, Dexter Gordon) and Lenny White (Jackie McLean, Miles Davis, Return To Forever, Chick Corea).

Allison Miller (I11.):

> *I hear sound and then I want to make that sound. And a lot of times it's not a singular sound. I think that's that a big thing for me is that I don't want it to sound like one thing. I want it to sound like layers of sounds. So that's when I'll do something like where I'll put my keys on my floor tom; then I'm getting a jingle and also the head sound. ...But I've never straight up tried to emulate a hip-hop groove or like a drum machine groove. I'm always trying to make to make the listener just go, 'Hey, wait. What is that sound? ...It still has the lilt of a human playing it. But what is that?' ...It's almost like I'm trying to replicate nature more than anything. ...And maybe that comes from the different kinds of music I've listened to. Maybe it comes from studying classical music and world music where I spent a lot of time playing in West African ensembles when I was in college*.

5: The Hybridization of the Drummer as DJ and live Beat Producer

Current trends in popular music culture are placing ever-increasing demands on the live drummer, particularly within the genres influenced by hip-hop and breakbeat culture. Drummers in these genres are required to assimilate and emulate rhythmic vocabulary and sonic textures that are not always native to the chosen style or the acoustic drum set. Because it is quite common for both pre-production and the creation of music to occur completely within the context of the DAW, drummers (and the remainder of the live band) are oftentimes not brought into the creative process until the rehearsals before recording or performance. As such, they are frequently required to learn a composition that is comprised of a multitude of simultaneous rhythms programmed using virtual instrument sounds. In this case, the drummer must decide which rhythms are most important or can be combined to create polyrhythmic gestures, which must be omitted, and/or how to recreate the sounds created within the DAW or drum machine. This process often leads to instances where the drummer must push their performance ability past norms requisite to their given genre and affect the acoustic drum set beyond the scope of any drum sound an acoustic preparation or affectation may provide. In this situation, the contemporary drummer may elect to employ electronic devices that allow for a limitless sound palate and the triggering of any kind of drum, percussion, or musical loops.

There is technology available to the contemporary drummer in the way of electronic drum sets, electronic drum pads (singular and multi-pad configurations), and triggers that can be applied to acoustic drums that enable the layering of acoustic and sampled sounds and the performance of recorded loops, etc. Any of these options alone or in combination can be used by the drummer to play or recreate the sound palate created within the DAW. It is worth noting that these options are widely employed in addition to the affecting/preparing of acoustic instruments.

There are several professional drummers currently working as self-contained musical acts in such a way that they produce all the sounds required for a live music performance: KJ Sawka, The Hybrid Drummer, and Michael Schack to list but a few. Using technology, these drummers perform not only the drum and percussion sounds but all their accompaniment as well. They typically produce their accompaniment in a DAW and then either trigger the

performance of this accompaniment within the DAW or load the performance(s) as a sample in a sample pad – a drum pad device capable of playing a sample or loop when a pad is struck. Their drum sets are often in a *hybrid* configuration – a term currently applied to drum set configurations that employ a combination of acoustic drums and electronic drums, pads, and/or triggers. To this end, it is significant to note that these drummers are now occupying several musical roles simultaneously: the role of drummer/musician, the role of technologist (employing the drumming technologies), and the role of producer (creating appropriate sound palates/sound design, composing rhythm tracks and/or accompaniments), further reinforcing the cyclical and reciprocal relationship between the drummer and the DJ/beat producer.

"Why do you suppose drummers are now incorporating technology in their acoustic setups?"

Greg "Torch" Sgrulloni (I20.):

> *The musical landscape we're in right now…most of what you're hearing on the radio, even if it sounds like a band, it's not even a band. It's probably not a real drummer and it's probably not a real bass player…a lot of it is something that's been produced by a desktop. I'm not saying that there aren't live instruments, but that a lot of it is just production based. I would almost argue and say that pretty much everything you're hearing now is electronic music, even if it's even if it's pop or country, because everybody's doing it on ProTools and Ableton. I think that the way people are hearing music now is electronic. If it's something you're hearing that is not just a straight acoustic snare drum (and that's often the case), you have to augment your setup. So that's where things like triggers come in and you have to hybridize your drums to get that sound. It's super common now because that's the landscape we're in."*

Adam Deitch (I3.):

> *There's a huge evolution that has been happening with recording live drums, which is midi mapping audio. With Break Science now, I lay a drum track down live to a sample or a click or whatever. And then Borahm [Lee], my partner in Break Science, he midi maps that [in Ableton Live]. So, everything I played could have another sound added to it – exactly on top, flush with it. 'Drumagog' [drum VST software] and things like that were beginning to do that - it was kind of like slow and tedious. I think the combination of live drums with your favorite sample library or drum machine on top is the evolution. And you're getting the ghost notes and the feel of a live drummer, the push and pull, the ebb and flow, the wavy-ness. And you're also getting those beautiful crackled, sampled drum sounds that you've loved for years on hip-hop records - and you're fusing those two together. …I always like layering things on top of my live drums - like a maybe it's a snap or a clap or a tambourine…that sort of thing. But now with midi mapping you can try and see how this kick sample works with your live kit. And then you keep switching through sample kicks. You find one, and it goes "BOOM!". And you're like, oh, that's it! Then, let me try these 50 snare samples and see how this*

works with my live snare. And I'll leave the original snare track in place so you can hear ghost notes from my live snare – using the midi track to reinforce the 2 & 4. I think that's an organic way of approaching technology in 2020."

John Roberts (I18.):

> *You can't play Jimmy Jam and Terry Lewis music without having triggers on your snare and your kick. I was 23 old when I got the gig [with Janet Jackson]. I was coming behind Jonathan Moffett. Yeah. And they were already using the electronics because that was part of the sound. You know, even before Jonathan it was Derek Organ. And he was using all dDrums…all electronic dDrums. So was just like, [sings electronic drums sounds] that sound. …To play an acoustic kit, playing that music, it's just not going to fit - even if you had the…Pro Tools tracks and you're playing along to it. It's just not the same thing. You have to be that sound for that band, for [Janet Jackson]. …So when I got in there, I had to learn quick how to use electronics the right way for that for that sound,…I learned about having the triggers on the kick and snare and the electronics on the side. We had a drumKat back then…and we'd have racks of sample sounds that we were pulling from each record. I was using the [Akai] S1000, I had two of them by me with my tech and we would load floppy disks for each song…it was a tedious job back then. I used to have a pedal to change the sounds from one pattern to the next.*
>
> *But now, I don't have to hit the pedal anymore. The last gig that I did with [Janet Jackson] which was in 2017, all of those sounds went straight to my [Yamaha] DTX setup. Now we've put it into Pro Tools or Ableton, whatever. And whenever your song starts, it changes the electronic sounds with the whole program. …Just as an example of the evolution of going from '94 till now - the electronic game, the technology is just phenomenal.*

It is noteworthy that though the advent of trigger and sample libraries have indeed augmented the drummer's available sound palate, this can come at a cost in terms of performance ability. As advanced as the trigger technology is today, triggers are still limited in their ability to accurately track the various nuances performed by dynamically versatile and/or rhythmically adventurous drummers. Even if latency between the trigger and the sound produced by the drum module or DAW is nil, the drummer must still contend with the trigger and the hardware and/or software's ability to sense and translate the sonic impulses from the drumhead into realistic performances. Though many parameters[41] can be adjusted to accommodate a drummer's playing style, it is still quite common for false/sympathetic or double triggering to occur, creating unintended sounds.

[41] Adjustable parameters commonly found within an electronic drum module or DAW drum software may include: pad/trigger type, input gain, velocity curve, velocity thresholds, and dynamic ranges.

John Roberts (I18.):

> *I couldn't play all the stuff that I would want to play [because] of triggers on the drums. I can't do [sings fast snare fill] because if I'm using a snare [triggered sample] that sounds…industrial, it sounds like a gun to shooting off. You have to play very minimal…and maybe the fills can come out on the toms and stuff, which don't have any triggers on them.*
>
> *But, the kick and snare - even if I want to do like [sings quick bass drum rhythms] …I can't even do that because it [false] triggers…the trigger. If it's not hitting the trigger the right way, it sounds like a double hit. It'll sound like [sings stuttered, flammed sounds] and it's going through the whole house, and people are trying to dance, and they hear it. …Everything has to be solid, straightforward."*

Drum Trigger, Drum Module, and DAW-related Drum Performance Options

In an endeavor to provide the broadest and most complete sense of the role of the contemporary drummer, a brief overview of drum triggers, drum modules, and DAW capabilities as related to live drum performances is provided below. Note, however, that this overview is surface level and intended only as a reference to the broadest capabilities of these technologies.

In the most basic sense, drum triggers are devices applied to drumheads or drum shells that transmit an electric signal converted (oftentimes) by a piezo transducer from the vibrations caused by striking a drum to a drum module/MIDI converter. The MIDI converter then converts that electric impulse into information that will trigger a sound or into MIDI information that can then be sent to a DAW or other software. There are a wide variety of drum triggers on the market today, available at a broad range of prices. Though they operate similarly and are composed of mostly the same technologies, they can vary quite dramatically in form factor. The less expensive triggers tend be contact triggers—piezo transducers that are affixed to the drumhead or drum shell by means of some type of adhesive. While generally effective, this type of trigger tends to be more fragile, with its transducer, wiring, and connectors (usually female TS or TRS) exposed to the player. Additionally, this type of trigger tends to be more prone to experiencing false triggering via sympathetic vibration, regardless of the parameters set within the drum module or DAW. Though, they can be easier to hide from audience view and less visually distracting.

More robust and resilient to wear are the triggers that attach mechanically to the rim of a drum. In this type of trigger, the transducer is located within a plastic or metal housing that quite often includes a female TS, TRS, or XLR connector. All the trigger's sensitive/delicate parts are nestled safely within the housing, offering more longevity to the trigger. Additionally, several triggers in this category offer options by which there is minimal, if any, contact with the drumhead. This is made possible using a cone-shaped foam material between the drumhead and the transducer, with the tip of the foam cone touching the drumhead. Some manufactures who employ this method further provide the drummer the option of adjusting the depth of the cone to allow for differences in drum manufacturing. Also of note, these types of triggers may provide the option of triggering multiple zones on a drum, i.e., the drumhead and rim separately, providing the drummer with additional sonic opportunities.

Other manufacturers have created drumheads with embedded trigger technology. In this case, the trigger mechanism is placed between the layers of mylar used to construct the drumhead. This option, though useful, did not seem to find much favor in the commercial market, perhaps because of the price point or because the trigger technology required proprietary hardware due to the "force sensing technology" employed in place of a conventional transducer. Perhaps another reason this type of trigger technology did not find commercial staying power has more to do with the visual aesthetic; as stated before, the trigger system requires the use of proprietary hardware that must be mounted via mechanical means to the drum and also requires the use of a multitude of wiring connections over and above the typical one-cable-per-trigger scenario usually encountered.

Drum modules, or "drum brains" as they are colloquially named, are devices capable of converting electronic impulse information into sounds installed on the drum module. Drum modules come in a variety of size and capabilities, allowing the drummer to input few or many triggers, choose from a wide variety of conventional and/or unconventional drum/percussion sounds, and record and/or play back audio loops. Additionally, and depending on a specific module's capabilities, any number of onboard effects may also be available for further tailoring any sound to the liking of the user. The effects might include a multitude of reverbs, delays, distortions, filter modulators, loopers, reverse loopers, etc. – all of this in addition to the aforementioned ability to shape each instruments response via ADSR controls (attack, decay, sustain, and release).

Drum modules were historically sold as part of an electronic drum set. However, in the last decade, drum modules have become smaller, more affordable, and used as a convenient way of triggering sounds from acoustic drums via triggers, rather than using the drum pads supplied with the electronic drum set. To be clear, there are still drum modules dedicated to specific electronic drum set configurations, though purchasing these modules separately has become more common. Resell websites such as eBay, Reverb.com, Craigslist, etc. seem to always have a ready supply of drum modules available without the remainder of the electronic kit.

Currently, though, it is far more common to see a live drummer using an electronic drum pad such as the Roland SPD-SX, SPD-30, Yamaha DTX-MULTI 12, DTX700, or Alesis Strike Multipad as a sound source for triggers. These devices provide not only a convenient array of pads to which sounds may be assigned, but also the ability to input some number of triggers. If a drummer wishes to use something with a smaller formfactor and only trigger a minimal number of sources, devices such as Roland's RT-MicS, TM-2, Yamaha's EAD10, DTX-PRO, or Pearl's R.E.D. Box will provide the drummer with anywhere from 1 – 6 trigger inputs and a smaller library of sounds from which to choose. However, because the ways and reasons for which these modules are increasingly employed, the manufacturers have provided sounds that were most often used, such as hand claps, synth snare drums, synth bass drums, and synth percussion sounds – generally reminiscent of vintage drum machines like Roland's TR-808, etc.

Though somewhat antiquated in their functionality compared with their DAW counterparts, drum modules are still widely employed for a few reasons: there is no latency between the trigger and the sound production, drum modules rarely (if ever) crash like a computer's operating system, and they are an all-in-one system requiring no additional technologies (other than amplification) for effective use.

DAW-based drum triggering will provide the greatest number of options where sound libraries, effects, and sequencing are concerned. Within the DAW a drummer may use the DAW's supplied sounds or purchase drum sounds from a plethora of boutique drum sound designers. Additionally, the drummer may create sequenced drum/percussion loops, import or record any other audio, and trigger/playback this audio by simply striking a triggered drum (or trigger device). Furthermore, the drummer may take advantage of any of the production

capabilities native to the DAW or purchased in the aftermarket. These capabilities can far surpass what is available within most drum modules. However, there is one significant drawback to using DAW-based drum triggering – latency. Experiencing any amount of delay in response between the strike of an instrument and the production of sound can be crippling to the performance of a drummer (or likely any musician!). Latency in DAW-based triggering generally is a result of the signal path and processing that must occur within such a complicated digital scenario. Before the signal impulse from the trigger can be interpreted by the DAW, it must first pass through a trigger interface that will transform the electric impulses into MIDI information which is then sent to the DAW, typically via USB connection.

Also of consideration within this setup would be the computer's processing power: the power of its processor, the amount of RAM available, etc. Though it is certainly common to see drummers using DAW-based triggering platforms in live performances, it is not as common as using a dedicated hardware (drum module) option. For this reason, it is far more common to see DAW-based drum triggering in recording studio applications where drum performances can be tracked on triggered acoustic instruments and separate audio and MIDI performances can be captured and later edited together to create bolstered or unique combinations of sounds.

6: Prepared Instruments

Since drums were first recorded, drummers have been affecting the tone and sustain of their drums and cymbals for a variety of reasons. In the earliest recordings of drums, materials were applied to drums and cymbals to simply decrease their volume, as recording technologies were ill-equipped to handle the amount of volume produced by a drum set. As mentioned previously in this document, there exists a wide variety of materials, both homemade and commercial, that can be applied to drums and cymbals to singularly or in combination affect their tone, sustain, or tuning by simply applying them to the surface of the instrument. The reasons a drummer might apply any of these preparations could be as simple as trying to make a substandard instrument sound better, or as complex as trying to emulate a digital sound – and anything in between. Which is to say, a drummer's reason for preparing their instrument can be as unique as the player themselves.

Objects Applied to Drums

Historically, objects applied to drums were typically items that the drummer might have at hand, such as tape, handkerchiefs, a wallet, or some other item of substantive mass and/or size. More industrious drummers might cut up fabric (such as t-shirts) and simply lay the cutout material over the drumhead or more permanently secure it between the drumhead and drum hoop. The only consideration was that the item placed on the drum should not create extraneous noise when the drum was played. To that end, drummers in the jazz, rock/pop, and concert setting have all utilized this technique. In fact, it became so ubiquitous that grade school students learning to play snare drum would learn to play their drums with a wallet or similar items on their drum, often believing this was just a normal part of setting up their instrument. Again, from Trevor

Trevor Lawrence Jr. (I10.):

> *I created [a product] called The Drum Wallet [and using it] was one of the things that I did religiously. And old 'heads' know, but all the young kids were like 'Oh my God, you put a wallet on the snare?!' And, obviously we had tape. We know tape was always a thing…and paper towels. You got all these drummers that come out of certain places and you'll see them do certain things the same way. Like some people in Memphis…are using the strict tape with the paper towel or the toilet paper. Then some cats are doing the real small spliff style…that they do out here at the edge of the snare drum. Then*

you've got people that do the crimp thing where it's like a little tape that is fit together to look like an old radiator.

Today, the art has progressed to a point where modifying the sound of an acoustic drum is so prevalent that an entire portion of the drum market is devoted to the production of these materials. There are numerous brand options from which a drummer may choose any number of drum preparations in almost any type of material. All the larger drumhead manufacturers offer tone and sustain control devices with size options for any drum[42]. Some of these options simply lie on the drumhead while others are installed between the drumhead and drum and secured by the drum's hoop and tensioning system. Other, newer brands to the market, such as Big Fat Snare Drum, Kick Pro Pillow, Roots EQ, Drum Tortillas, MoonGel, DrumDots, DrumTacs, Snare Weight, Tackle Instrument Supply Co., and Black Swamp, offer a wide variety of ways in which to augment the sound of a drum, from tone control to pitch alteration to adding any amount of noise.

In addition to offering the drummer a way to augment or control the sound of their drums, a much more practical reason exists as to why a working drummer would keep any number of these items on hand now: the backline drum set. The traveling drummer is often asked to perform on a "house kit" that has rarely if ever been well maintained or serviced. Applying these tone control or tone augmenting devices to a drum set that is compromised can make an offensive-sounding instrument sound passible, if not necessarily "good."

Items that Dampen Tone

As noted above, there are many items available on the market today that will control the tone and sustain of a drum. The items can be made from just about any type of material, ranging from cloths to plastics to metal, depending on the desired effect by the drummer. Most of these items are simply commercial versions of objects that drummers made or had on hand prior to their being available commercially. For instance, Remo's O-Rings are plastic rings cut to the diameter of the drum and made out of the same material they use in their drumhead manufacturing. Prior to items like these being commercially available, drummers would simply cut out an old drumhead into the shape of a doughnut and lay it on the drumhead. The

[42] Remo Drumheads: "Muff'l Control Ring," Remos." Evans Drumheads: "Sound Control." Aqaurian Drumheads: "Studio Rings." These are but a few of the offerings from these prominent drumhead manufacturers – There are indeed many more options.

advantage of the commercial option is that the homemade versions were often so warped by playing before being cut that they would not lay well on the drumhead, causing unwanted vibration noise, or they would not stay where installed.

Similarly, drummers of old would cut out a drumhead from its counter hoop and lay the entire cutout head on top of a drum of the same size. This practice was something of a guarded studio secret in the 80s and 90s, as a technique for achieving a very controlled, punchy, and dry snare drum sound. This is so effective for snare drums that the brand Big Fat Snare Drum has come into the market to offer a line of products that does just this. They currently offer sizes for all common size snare drums and toms and have models in a variety of thicknesses, with and without center cutouts, and some with pre-installed tambourine jingles.(see Appendix 2, figures 27-34, pgs. 130-132)

Other more common and easily applied/removed options tend to be made of some type of gel material cut into various shapes, about 1-inch by 1-inch square. One of the more popular brands for this is MoonGel. This brand provides drummers with five of these gel pads in an easy-to-carry plastic container, which is usually sufficient to tame unwanted overtones from a snare drum and toms and fits easily into a drummer's stick bag. Interestingly, these gel squares, which are sold at a premium, are essentially the same material that is sold as gel "window clings" for decorating. Again, drummers of old that were "in the know" used these gel "window clings" long before they were commercially available. (see Appendix 2, figure 39, pg. 134)

Items that Create Distortion

In recent years, thanks to the propagation of hip-hop and EDM styles of music, the need for the live drummer to be able to emulate digitally-created sounds has increased dramatically. Due to contemporary trends in music production and sound design, it is now common to hear intentionally-distorted drums. To that end, there are commercial options available of which the contemporary drummer may take advantage. These products range from items that rattle and buzz to more exotic items that can make it sound like distortion and compressed reverb are being applied to the drum.

One of the most common items to be used to create distortion on drums (though generally applied to snare drum) is the application of a small cymbal to the drumhead. By simply laying a 6- to 8-inch cymbal on the drumhead, a distortion and gating effect can be created. In fact, the practice has become so common that a number of brands have begun offering commercial options for this application specifically. Both Meinl and Stack Ring Percussion now offer cymbal and cymbal-like metallic devices. Meinl's version has a handle included with which the drummer may grab the cymbal during performance, opening and closing the cymbal on the drumhead like the lid of a container, thus creating a wide variety of sonic effects. (see Appendix 2, figures 36, 37, 41, pgs. 133-134)

Adam Deitch (I3.):

> *...The splash on the snare I got from my friend Mark Simmons. Which was a mistake, ...he hit the splash once and it fell off the stand, landed on snare and he kept playing the groove into it. ...It really sounded like a handclap or like an 808. ...I've been incorporating that into like Trap and bounce beats for 15 or 20 years now. ...And also, I have this eight-inch snare drum, which is tiny, which I call the trap snare, and you just place it on top [your primary] snare. And it sounds exactly like a trap drum machine's snare. I'm into acoustic triggers. I'm not into drum machine triggers, like, finding samples like that. I like things that are organic but sound electronic.*

The Stack Ring Percussion brand offers a choice of products created from recycled cymbals that range from mini cymbal-like options to shards of cymbals connected via cable loop that can be placed upon the drumhead to create a variety of distortion-like effects during live performance. (see Appendix 2, figures 36-37, pg. 133)

In addition to creating distortion effects during performance, all of these items have the added effect of tone control as well. When anything of substantive mass is placed upon the drumhead, the drum's resonance will be mitigated to an extent. This can be of value to the contemporary drummer when trying to emulate digitally-created or affected drum sounds. However, if the goal is only to add the distortion effect and not to subdue the resonance of the drum, the drummer must work to find a balance between adding sonic characteristics and affecting the resonance. This can be quite a challenging task.

Items that Affect Tuning/Pitch

When a drummer applies certain materials to the drumhead, the perceived tuning and pitch of the drum can be altered dramatically. In the case of adding the cutout drumhead over the

installed drumhead, the effect can be to lower the perceived pitch of the drum. In the case of the Big Fat Snare Drum products (which all have a rubber gasket installed around the perimeter of their devices), the added weight of their products on the installed drumhead can lower the pitch of a drum by more than an octave. (see Appendix 2, figures 27-34, pgs. 130-132)

Conversely, when a small cymbal is applied to the installed drumhead, the perceived pitch of the drum can be raised significantly. Because of the manufacturing techniques associated with most cymbals, there is a great deal of variation in the mass of cymbals – even of cymbals with the same diameter. Because of this, it is difficult to measure what effect any cymbal might have on the perceived pitch of a drum until it is determined in real time. Suffice it to say, cymbals with more mass will raise the pitch more than those with less mass. The raising of the pitch is due to the mass on the drum being applied around the cymbal's circumference, not uniformly across the cymbal's diameter. Depending on the mass and diameter of the cymbal employed, the drummer may also experience the distortion effect of the cymbal on the head if the cymbal is not heavy enough.

Less common but equally effective methods of affecting the pitch of drums do exist. One unique method employed by drummers such as Glenn Kotche and Allison Miller is to affix a PVC tube to the air vent on the side of a drum. Most drums become airtight if their air vent(s) is occluded. However, with a tube affixed to/through the drum's air vent, the amount of air pressure within the drum can be manipulated, causing the amount of pressure on the drumheads to change. When one blows air through the tube into the drum, the pitch of the drums can be raised. When the air pressure is released the drum will return to its original tuning. This manipulation of the air pressure within the drum gives the drummer the ability to change the pitch of a drum in real-time at their discretion, while requiring no loss of coordination in the hands or feet, such as a drummer might encounter if they were having to affect tuning changes on a computer or other MIDI-type controller.

Allison Miller (I11.):

> *I'm always going for melodies on the drums. I'm always searching for ways that I can make the drums sound more [melodic]. And I think that has definitely swayed me in the direction of experimenting. For instance, when I put these plastic plumber tubes, you know, in my drums. That's my way of…being able to speak…play with more melody, but also speak with more inflection, like a human voice does.*

Objects Applied to Cymbals

In the jazz era of the late 1940s and beyond, it was common for a drummer to use a cymbal with rivets installed to create a white noise type of sound. This also had the added effect of lengthening the sound of the cymbal's decay via the vibration of the rivets within it. Today, drummers still apply materials to their cymbals to create desired effects that may include altering the cymbal's tone, sustain, or pitch to a degree. Although not as common as affecting a drum's sound, affecting cymbal sounds is certainly not a rare occurrence and the commercial options available for the contemporary drummer are many and varied. It should be noted that any cymbal on a drum set can be affected by means of applying materials to the cymbal—hi-hat, ride, or any type of crash.

Items that Dampen Tone

There are many ways in which a drummer might alter the sustain and decay of a cymbal, be it a crash cymbal, ride cymbal, or otherwise. Historically, and prior to commercially-available products, the process was usually to apply some amount of tape. This, however, was not ideal, as it often left sticky residue on the cymbal and over time this residue could accumulate to a degree that would compromise the cymbal's resonance even if tape were not applied. If tape was unavailable, the process of "squeezing" the cymbal between the felt washers by over-tightening the wingnut of the cymbal stand could also substantially reduce the sustain and tone of a cymbal. This is in part the reason many jazz drummers would opt not to use the upper felt washer or wingnut, as they were typically trying to achieve more sustain from their cymbals.

Today, there are a myriad of ways in which a drummer might affect the tone, sustain, and decay of their cymbals. Most easily, the same MoonGel product that can be applied to drums may also be applied to cymbals. A single MoonGel pad can have the subtle effect of shortening decay and making the cymbal more articulate. To a degree, a MoonGel pad also changes the perceived pitch of the cymbal. Depending on the placement of the MoonGel pad across the diameter of the cymbal, the effects can be more subtle or dramatic. If the pad is placed closer to the bell of the cymbal the effects will be milder than if placed along the bow of the cymbal or at its edge. The more MoonGel pads that are added to the cymbal, the more dramatic the effect, as one might logically conclude.

Another comparable product is Meinl's Cymbal Tuners. This product functions similarly to the MoonGel damping pads regarding the effect they yield and the ways they can be arranged on the cymbal. However, this product comprises two magnetic pieces that are attracted to one another and placed one on either side of the cymbal, opposite of one another. The benefit of a product such as this over the MoonGel option is that the material does not break down over time or require washing/maintenance.

Additionally, available for affecting a cymbal's resonance and/or tone is the Cympad. Cympads are made of neoprene-like cellular foam material, and depending on the variation of the Cympad used, could either enhance a cymbal's tone and resonance or mitigate it to an extent. If the drummer wishes to enhance their cymbal's sound, they may choose from a variety of Cympads in varying thicknesses and diameters. If the drummer wishes to mitigate their cymbal sound either by diminishing the volume of the cymbal or its sustain, a Cympad that is much larger in diameter is used under the cymbal to replace the standard felt washer. The added width in diameter acts to absorb vibration at the bell of the cymbal. This product certainly has a noticeable effect on a cymbal, though is generally more subtle than that of a MoonGel or Cymbal Tuner.

Essentially, the Cympad is used in lieu of the traditional felt washer either above and below the cymbal or below only. The advantage of this type of product, whether increasing or mitigating a cymbal's sonic qualities, is that it is consistently uniform from the manufacturer. Felt washers are notoriously inconsistent and, even when purchased new as an aftermarket upgrade, are known to have variances due to the nature of the organic materials from which they are created. In addition, felt washers inevitably compress and degrade over time, thus compromising a cymbal's sound.

Lastly, the process of stacking cymbals can dramatically alter a cymbal's resonance and tone. The effect of laying one cymbal upon another is that of almost completely removing the resonance and tone of the cymbal. Though stacking cymbals is becoming ever more common, the typical cymbal stack would generally involve cymbals of very different diameters to create a distortion or "trashy" effect. The mode employed to limit the volume and/or sustain of cymbals requires the use of two cymbals of same or similar size. This technique was widely used in the 80s and 90s during the filming of music videos where the drummer needed to appear to be playing live and loud. By stacking the cymbals on the drum set, the cymbal

volume was reduced drastically, thus allowing the drummer to play out without the added cymbal volume.

Items that Create Distortion

In addition to the riveted cymbal sound already mentioned, there are many other ways to create a rattling, sizzling, distorted type of sound with a cymbal. Just about anything that is light enough to vibrate on a struck cymbal and hard enough to rattle against a cymbal's surface can be used to create a wide variety of textures on a cymbal. Depending on the nature of the sound desired, items such as beaded chains, paperclips, coins secured by tape, loose tambourine jingles, etc. are all common methods of affecting a cymbal sound. Of course, riveted cymbals are still in use across a wide range of musical genres, but drummers today seem to prefer having the ability to quickly modify their cymbal sound by applying an external device rather than having to remove/replace a cymbal with fixed affectations within the setup.

It used to be that when a drummer had the misfortune to crack a cymbal, that cymbal would be thrown away or repaired if possible by drilling a hole through the ends of the crack, or the affected area might be cut out of the cymbal if a large enough crack occurred. However, today's drummers are more likely to keep a cracked cymbal and use over another cymbal in a stacked setup or simply use it "as is" in an effects capacity. Other items commonly placed upon cymbals to create rattling, buzzing, or distortion sounds include tambourines, keys, rattles of varying types (made of organic, metal, or synthetic materials), chains, and anything else that the drummer might have on hand in their home, auto, or studio.

Finally, a note about stacked cymbals: As mentioned earlier, the stacking of cymbals is becoming ever more common, as the sound produced can be "tuned" to a degree offering the drummer a fair amount of flexibility in determining the length of sound, tone, and pitch. In fact, the practice of stacking cymbals has become so prevalent in contemporary drumming culture that cymbal manufacturers are now offering stacked cymbal products. Commercially available cymbal stacks come in a wide variety of sizes and types. They may be a combination of china-type cymbals, may come with any number and size of holes pre-drilled into the cymbal (to decrease sustain and volume to a degree), and may include proprietary

mounting hardware that allows for applying a varying amount of pressure on the two cymbals from loose to tight, similar to the way in which a conventional hi-hat clutch operates.

7: Discourse on the Recorded Evidence

The following discourse is in reference to the recordings produced to date, which are presented in evidence of the cyclical/reciprocal relationship between the funk drummer and the DJ/beat producer. Additionally, these recordings aim to demonstrate the ways in which drum set artists are employing extended techniques and prepared instruments to create a produced hip-hop aesthetic. The two studio recordings *Analogous to Analog* and *Hybridization* are meant to be somewhat[43] chronological in nature. *Analogous to Analog* is intended to describe the rhythmic vocabulary and sound palate employed by funk drummers from the late 1960s through the present day. *Hybridization* is meant to describe recontextualized funk vocabulary and the sound palate present in contemporary funk, pop/rock, and hip-hop styles. However, the tracks on each recording are not to be considered in strict chronological order as they were arranged in a manner believed to achieve the aesthetic most beneficial for the listener. This is due in part to the production aesthetics employed/applied to the drum performances and tracks in general - and because funk drumming vocabulary did not evolve in any conventional, step-by-step manner, but rather branched in many directions simultaneously.

All the tracks from both the *Analogous to Analog* and *Hybridization* recordings began as loose, undefined musical sketches produced by Ryan Noise in the DAW, Ableton Live. Noise is a producer of music in a variety of genres for a multitude of applications ranging from commercial/pop to web content to contemporary worship. Noise is an artist in the extreme and not at all an academic (though he is quite cerebral). His methodologies are non-linear and would seem to follow a logic that he alone understands. When consulting with Noise on the production of the source material tracks, it became evident early on that giving him a set of parameters within which to work would be far more efficient than sitting and composing alongside him. Although he was very gracious and humble about trying to include ideas/instruction apart from his own, he is an artist of singular vision. In short, he had to be left alone to create, as he does not co-create well with others.

[43] "Somewhat" chronological in that the vocabulary employed or the affectation of sounds at source can be heard to evolve through the recordings relative to the way the inspirational source materials evolved through time. Though, this cannot be definitive or exact because of the relatively small sample size of tracks provided (12) per album.

Introduction to the Recording Process

The process of conceptualizing, writing, rehearsing, and recording material in support of this project was challenging in several ways. Initially, it was believed the challenges would principally lie in the capturing of quality, stylistically appropriate performances. However, in short order, it became evident that there would be many "hidden" challenges. In my career as a drummer and percussionist, I have had many experiences in the recording studio and with writing and creative processes. Generally, in these experiences, I am provided with either a demo of the music to be recorded or I am directly involved with the writing and/or arranging of the music. In both instances I am generally provided with the time to explore different drumming approaches, try out different combinations of drums and cymbals, and to rehearse the material in ensemble. The recording of this project has been an altogether different experience in that the rehearsals of the material generally occurred in the studio on days in which we had secured recording time. To this end, there was very little time for experimenting or developing individual parts in an ensemble dynamic and the pressure to produce exceptional performances on demand was always high.

The Recontextualized Record: *Hybridization*

Prior to receiving the original source material from the producer, Ryan Noise, there were several discussions about the types of tracks he would supply. These discussions covered genre, texture, tempi, metric feel, and the general personality of the tracks to be delivered. The goal in preparing this collection of tracks was to create an aesthetic that would capture the feel of hip-hop and funk music as it developed from the early 1980s through the present day, to include current trends in hip-hop, pop/rock, and funk music. To this end, the samples employed by Ryan Noise were often sonically gritty and lo-fi, or were affected within his production to be so. The addition of vinyl or tape noise would serve to "glue" the tracks together sonically by adding a bed of noise that, while not immediately obvious, is missed if not present.

The initial source material for what would become the *Hybridization* record was delivered in January of 2019, consisting of 13 tracks composed entirely within Ableton Live, a computer-based DAW. These tracks generally consisted of a drum or percussion track (provided to give context to the other instrumental tracks), a bass track, a guitar and/or keyboard track, a DJ

track that could consist of any number of non-musical (non-harmonic, -melodic, and/or non-idiomatic) additions in the form of rhythmic or vocal samples, and usually a track of sampled vinyl or tape noise. All these tracks would ultimately be replaced or recreated with live performances except for the DJ effects sounds, the occasional percussion loop, and/or the occasional sub-bass synth track.

This might appear to be all that is needed for a hip-hop track (and certainly even fewer tracks can be effective). However, my personal goals and direction for the project required additional live performances be added to increase the "liveness" of the tracks. The intent for the *Hybridization* recording was to avoid sounding or feeling programmed or quantized and to retain the live performance feel whenever possible.

The Creative and Recording Process

Before the recording process could begin, it was essential to determine what drum sounds would be most appropriate for this recording. Because the recordings would ultimately replace or be layered with the source material composed within Ableton Live (and this material already sounded processed and produced), determining the drum sound that would be most applicable and easily manipulated proved challenging. Many conversations were had about the nature of the drum sounds found on many early funk recordings vs. the recontextualized sound of those drumming performances found on hip-hop recordings, and which of those sounds would be most appropriate in supporting the source materials. Ultimately, it was decided that a sound closer to that of the recontextualized drum sound found on hip-hop recordings would be sought, though never to the extent that the acoustic "liveness" of the drums or the performance would be obscured.

To begin the creative process, I distributed the source material to the musicians involved in hopes of securing performances that I could add to the source material. When the time arrived to gather everyone in the recording studio it quickly became evident that there were as many approaches to the tracks as there were musicians. At this point there was a considerable amount of time spent over multiple weekends trying to determine the best way to incorporate the multitude of ideas. In the end, it became clear that the best approach was to try and capture the performances in as much of a live context as possible with all musicians playing in ensemble. With all the musicians wearing headphones or in-ear monitors, the recording

engineer would play the source track and the musicians present would play along, either overdubbing or creating new tracks over the original material. However, having all the various influences and approaches occurring simultaneously had the effect of tempering the output of the whole in such a way that no musician's initial approach was wholly utilized. Each musician had to adjust their approach and style in real time to allow room for the other performances happening in the room.

Although not the process that was originally conceived, research confirms that this method of working is not unusual. In fact, when James Brown, Parliament, Sly and the Family Stone, and other early funk bands would enter a recording situation, there was often no finished composition to be recorded. Rather, there was a group of talented musicians with a singular goal, gathered under the direction of one person within or outside of the group (perhaps a producer), each of whom would vamp on ideas until an idea was fleshed out. The band would then rehearse the idea as necessary and record it immediately. Oftentimes, overdubbing was not permissible due to technical constraints, or was simply not done due for fear of losing authenticity in the recording. This often led to performances that were not perfect in terms of musical accuracy, but the feel or "vibe" of the track would be exceptional, imbued with so much life and spontaneity as to make any performance issues negligible.

> *We would be in the studio, just sit around, I started with something like that and the bass player joined in, and the guitar player came in […] We just had a groove and so [James] Brown come in and says, "Let's make a song out of it" He started singing and we had a song: nobody planned it!*[44]

A typical recording day for this project would consist of the musicians gathering in the studio, setting up their gear, warming up, and generally socializing while the engineer finished preparing whatever session was to be tracked next. With the sound check complete and everyone comfortable with their listening and performing environment, the engineer would play the track and, in ensemble, the musicians would begin playing along, improvising over the track. This process might take only minutes before an appropriate instrumental part was discovered, or it might take an hour or so and involve conversations that led to an evolution in the instrumental parts or the arrangement of the original track. On more than one

[44] Clyde Stubblefield during a clinic in Toronto, Canada (2008) in The Drake Hotel, interviewed by Marley Marl Source: YouTube video: Clyde Stubblefield/ Funky Drummer

occasion, it was decided that, in order to make the track functional, it needed to be arranged in some way, which usually meant cutting, lengthening, or removing instruments from the original source material.

As was stated before, musicians would often arrive with preconceived ideas about what the track would ultimately become, only to later have their preconceptions completely obliterated. This was often the case in my personal experience. Because the original source material was delivered to me first, I had time to experiment with patterns and sounds before anyone else. As such, when I would begin the recording process, I would play what I believed to be parts appropriate to that end. And generally, my preconceptions of the rhythmic underpinnings of the track would hold sway over the other musician's preconceptions, and the track would most often move in a direction that was at least *related* to my original idea. However, as other musicians added their parts, their decisions would inevitably alter my perception of the track. It cannot be overstated how substantially the additional guitar, bass, and keyboard tracks would influence my performance. For instance, when I began preparing the track "Head in the Hole You Dug" (H4.) I had interpreted the performance tempo of the track twice as fast (174 BPM). However, upon consulting with the other musicians present at the recording session it was decided that a tempo more typical of hip-hop (87 BPM) should be employed. Over the course of tracking *Hybridization*, I conceded to additional changes in my interpretation for the betterment of the crafting of the tracks. These changes could be as subtle as the amount of swing I employed to ones as dramatic as the interpretation of the tempo[45].

Perhaps the most challenging aspect of recording this collection of tracks was remaining true to my original idea of what the aesthetic should be: psychedelic-funk-hip-hop. Too often, while rehearsing the tracks we (the musicians recording at the time) would wander into sonic territory that was too "rock" or too anything-else-other-than-hip-hop. The musicians, including myself, would have to constantly be reminded to play "less," which is to say, keep the parts simple. Hip-hop music is inherently uncomplicated and concerned more with feel and groove than technical dexterity, though this musical minimalism is what makes it accessible and powerful.

[45] Rehearsal segments of "Head in the Hole You Dug" (H4.) can been seen in Digital Asset (R6.).

However, in trying to achieve the aesthetic of 70s funk recordings (which are often sonically dense with drums, percussion, bass, guitar, keys, horns, vocals, etc.) we, the musicians, felt obligated to try and fill in the musical spaces. To this end, it was determined that simple, repetitive, and percussive/rhythmic parts were most effective. In this way, we were able to play and record many more ideas simultaneously, creating an effect akin to Phil Spector's wall of sound, typified on tracks such as The Beatles' "Across The Universe" (1968), The Beach Boys' "California Girls" (1965), and The Righteous Brothers' "You've Lost That Loving Feeling" (1967). Though we utilized far fewer musicians than Spector, through the technology of multi-tracking we were able create the illusion of a band with multiple guitar and keyboard players, similar to the Parliament/Funkadelic sound, though in an updated context.

Once all the tracks were recorded, the editing process began. It was clear from the beginning that far too much sonic information had been recorded to be useful or practical. However, it was possible to identify specific musical gestures within the guitar and keyboard parts that had the potential to provide the motivic focus for each track. As such, we began cutting and arranging the tracks in a manner approximating that used by producers in the hip-hop genre. When a segment was identified within a given performance, it would be isolated and removed from the whole, placed in a pool of samples, and later reinserted at my musical discretion. This had the effect of thinning out the overall mix, creating space for other voices, and adding to the collage effect. Interestingly, segments were often reinserted in places in which the musicians had not necessarily intended for them to exist. Segments were placed in the musical timeline in ways that sometimes completely changed their rhythmic context, or they were looped in a way that constituted an entirely new part.

Instruments Used in Recorded Performances:

To determine the best capture of sound, the drums were set up in several different places within the live room, many different types of microphones were auditioned, and many drums of differing sizes were assessed for their sonic qualities individually, within the context of the drum set, and within the musical context of the source material in the live room. Ultimately, a Gretsch New Classic drum set was utilized: 18" bass drum, 10" rack tom, and 14" floor tom.

A wide variety of snare drums were used during the recording of the 12 initial tracks, though generally the snare drum was 14” x 5.5”, regardless of manufacturer. It was determined that smaller drums worked better in this context because the sound was more focused and “punchy,” and the sustain easier to control. A wide assortment of cymbals was also utilized during this recording, though generally a 22” ride cymbal, a 14” or 18” and 20” crash, and 14” and 15” hi-hats, and a cymbal stack (a 14” crash placed on another 18” crash) were used.

In addition to the acoustic drums and cymbals employed, many implements were applied to the drums and cymbals to create the sonic illusion of stacked sounds. Quite often in hip-hop recordings, when a funk drumming sample is used a second layer of drum sounds will be added to bolster the original drum performance. Sounds such as hand claps, white noise bursts, Roland 808 or 909 or other synthetic bass drum, snare drum, and hi-hat sounds are added to heighten the hip-hop aesthetic or to simply reinforce sonic deficiencies in the original funk drumming sample.

To this end, a number of homemade and aftermarket products were employed, most often on the snare drum or cymbals. One of several products from the company Big Fat Snare Drum was generally used to create a snare drum sound reminiscent of those captured on 1970s funk recordings. These products generally consist of a circular disc of plastic or mylar cut to the diameter of the drum. Depending on the thickness of the material, the sound of the snare drum can change dramatically from a simple “dryer” version of the unaffected snare to a wholly new sound from the drum, sometimes sounding up to an octave lower. Additionally, some of these discs are fitted with jingles that have the added benefit of creating a snare and tambourine strike simultaneously. Big Fat Snare Drum also offers a product that replaces the fabric that many drummers employ to subdue the tone of their drums. Their product is a fabric disc cut to the diameter of the drum. The benefit of using a product such as this is that because it is cut to size, hemmed, and has a convenient pull tab, it stays in place and is easily removed to facilitate quick changes within a performance. Additionally, this product is considerably thicker than the typical handkerchief usually employed for this purpose. This also affects the resonance, tone, and (to a degree) the pitch of the drum.

Another product I often employed to affect the sound of the snare drum during the recording process is the ReFX Crop Circle by Dream Cymbals. This device is made from a recycled cymbal, cut to the diameter of the drum, and cut out in the center except for 1.5” at the

perimeter. Additionally, several jingles are bolted to the device at evenly spaced intervals. When employed, this product creates a white-noise, hand-clap, snare-drum stacked type of sound. Another Dream Cymbals product used is the Naughty Saucer. Like the ReFX Crop Circle, the Naughty Saucer is made from a recycled cymbal cut to the diameter of the drum. However, the cutout portion of this device is only about 6", leaving approximately an 8" width of cymbal material just inside the perimeter of the snare drum. The effect of the device is that of a digital, white-noise, snare-like sound. This is a difficult device to employ, as it requires a certain amount of performance precision in order to get a consistent sound from the snare drum. Additionally, if the player is not careful, the inside edges of the device will quickly devour a drumstick due to its un-lathed, sharp inside edge. However, the sound is unique and wholly appropriate in the context of this endeavor.

The snare drum sound was affected in yet another way by employing another aftermarket product, the Mini Bell by Stack Ring Percussion. The Mini Bell is again made from recycled cymbals, though in this instance it is only the bell of the cymbal that remains after the rest of the cymbal is cut away. The remaining cymbal disc is between 6" and 8.5", and when placed upon the head has the effect of raising the pitch of the drum approximately a major 3rd and gating the resonance of the drum dramatically, though not entirely. Because the cymbal floats for an instant when the drum is struck, the drum does in fact resonate for the briefest of moments. Again, this sound is quite appropriate when used in the context of hip-hop drumming.

In order to achieve a Roland 808 snare drum sound acoustically, two different methods were employed with varying degrees of success. The first method employed was to simply use an extra set of snare wires laid upon the top of the snare drum. These snare wires were held in place by a product called Drumgees, a thin bungee cord with clips designed to be affixed to the hoop of a drum. Playing the snare drum with the extra snare wires laid across the top of the drum did produce a unique sound, though not the one intended. Although it did have some of the Roland 808 snare characteristics (a slightly distorted, overdriven sound and extra high-end frequency response), the effect was not easily recorded. Acoustically, in the recording studio, the sound was excellent and very near to the desired effect, but when recorded the sound was mostly noisy and not particularly effective. This is likely due to the volume at which the affected drum was played. In hindsight, had I been able to perform the track at a much-reduced dynamic, the recorded sound would have likely captured more of the

affected acoustic sound. However, when played at the dynamic I had been utilizing, the effect was mitigated.

Another option employed was to remove the batter head from a snare drum and place it on the bottom of the drum in place of the resonant head. No drumhead was replaced on the top of the drum, leaving only the batter head under the snare bed. This option immediately produced an 808-type snare sound. It was hyper-articulate, crisp, and cutting, due in part to the snare strands restricting resonance of the batter head and having no resonant head installed to facilitate sustain. Again, this sound in the room was tremendous, but capturing the sound effectively was difficult and required more EQ than normal to make it sit appropriately in the mix. Again, this is likely due to the dynamic of the performance. (see Digital Asset R2 – Auditioning Upside-down Snare)

Figure 27: Snare drum fitted with batter head under snares on resonant side – no head on opposite side of drum

In the DAW-based/produced hip-hop aesthetic, acoustic cymbal sounds are not often employed, primarily because acoustic cymbals require quite a bit of sonic space in the mix to sound appropriate and they tend to resonate longer than typically effective for the genre. As such, synthetic cymbal sounds (i.e., Roland 808 and 909) are often used to replace the hi-hat and crash cymbal sounds found in funk drumming samples because they require much less sonic space to exist effectively. Also, the synthetic sounds tend to be much shorter and easier to control in the overall mix, allowing the producer more opportunity to shape the cymbal sound and headroom to push the volume without the harshness that can occur when acoustic cymbals are mixed too loudly.

In order to facilitate a cymbal sound that was both unique, sonically appropriate to the endeavor, and easy to place in the mix, implements were placed on the hi-hat, ride, and crash cymbals during the performances. Most often, a Meinl Ching Ring was placed on the hi-hats to temper the resonance of the cymbals as well as adding a bit of "distortion" to the hi-hat sound. The Ching Ring has the added benefit of creating a tambourine sound when the hi-hat cymbals are operated via the hi-hat pedal. It can also be struck while lying on the cymbals to create additional sounds when required. MoonGel[46] pads were applied to the hi-hat cymbals at times to temper the resonance of the cymbals without adding unwanted noise.

The Stack Ring Mini Bell was sometimes placed upon the ride cymbal instead of the snare drum to temper its resonance and create a more staccato ride bell sound. The Mini Bell also acts to create a bit of a distortion effect when placed over the bell of a crash or ride cymbal. In addition, the ride and crash sounds were sometimes affected by applying MoonGel to their surfaces. If placed between the bell and edge of the cymbal, they can dramatically shorten the sustain of a cymbal.

Perhaps the most affective device placed on the cymbals was the Crunch Ring by Stack Ring Percussion. The Crunch Ring is again made from a recycled cymbal cut down to a random size between 8" and 10.5". The cymbal ring then has other random metal materials bolted to it (jingles, washers, pieces of cymbals, etc.) creating a very trashy white-noise generating device. When placed on a cymbal, the Crunch Ring drastically shortens the resonance of the cymbal while adding a burst of white noise to the attack. Again, this sound is very useful within the context of this endeavor.

To achieve the tuned 808 bass drum sound, a Big Fat Snare Drum disc was applied to the 14" floor tom. This disc has the effect of lowering the fundamental pitch of the drum, tempering its resonance, and improving its articulation. The floor tom is played as an 808 bass drum on several tracks in the recording project.

[46] MoonGel is an aftermarket product, essentially a sticky, gel, damper pad that can be applied and reused as often as the player likes. They are ≈ 2" x 1" and very useful and damping drums or cymbals.

Table 1. Instruments and Affectations: Hybridization

Track	Snare(s) Used	Snare Effects	Cymbal Effects	Other Items
1.	1. Ludwig LM400 2. Gretsch S1-0610	1. BFSD – Steve's Donut 2. Stack Ring – Crunch Ring	Ride: Stack Ring Mini Bell Hi-Hat: Meinl Ching Ring	MoonGel tab on ride and crashes
2.	1. Gretsch G4160HB 2. Gretsch S1-0610	1. Dream ReFX Crop Circle 2. MoonGel	Ride: Stack Ring Mini Bell Hi-Hat: Meinl Ching Ring	MoonGel tab on ride and crashes
3.	1. Tama 6.5x14 Copper (played upside down) 2. Gretsch S1-0610 (used as timbale effect)	1. MoonGel 2. N/A	Ride: Stack Ring Mini Bell Hi-Hat: Meinl Ching Ring	MoonGel tab on ride and crashes
4.	1. Tama 6.5x14 Copper (played upside down) 2. Ludwig LM400	1. MoonGel 2. Evans E-Ring	Ride: Stack Ring Mini Bell Hi-Hat: Meinl Ching Ring	MoonGel tab on ride and crashes
5.	1. Gretsch NC1-6514 2. N/A	1. BFSD – Steve's Donut 2. N/A	Hi-Hat: Meinl Ching Ring	MoonGel tab on ride and crashes
6.	1. Ludwig LM400 2. N/A	1. MoonGel	N/A	MoonGel tab on ride and crashes
7.	1. Gretsch G4160HB 2. N/A	1. Dream Naughty Saucer	Ride: Stack Ring Mini Bell	MoonGel tab on ride and crashes
8.	1. Ludwig LM400 2. Gretsch NC1-6514	1. Evans E-Ring 2. Dream Naughty Saucer	Hi-Hat: Meinl Ching Ring	MoonGel tab on ride and crashes
9.	1. Gretsch NC1-5514 2. N/A	1. Handkerchief	N/A	MoonGel tab on ride and crashes
10.	1. Tama 6.5x14 Copper (played upside down) 2. N/A	1. MoonGel	Hi-Hat: Meinl Ching Ring	MoonGel tab on ride and crashes
11.	1. Gretsch NC1-5514 2. Gretsch G4160HB	1. MoonGel 2. MoonGel	Hi-Hat: Meinl Ching Ring	MoonGel tab on ride and crashes
12.	1. Ludwig LM400 2. N/A	1. BFSD – Original	N/A	MoonGel tab on ride and crashes

Microphones, Audio Interface, and DAW:

To capture the bass drum sound, a Shure Beta 52 and Shure KSM44A were used. The Beta 52 is a "go-to" workhorse in live and studio settings for capturing bass drum and other low-end frequency sources with high SPL output. The KSM44A has a much more refined sound without the pre-EQ'ed sound one might expect from a bass drum microphone. It excels at

capturing the mid and upper-mid frequencies in the bass drum and in conjunction with the Beta 52 creates a robust and balanced sonic picture of the bass drum. Using the sound from these two microphones in varying degrees within the same track provides the ability to contour the bass drum sound to the track with minimal processing. The bass drum is recorded without the resonant head installed and both microphones were positioned in the center of drum's diameter, just outside the front of the bass drum. The bass drum is then covered with a thick utility blanket to help isolate the bass drum sound from other drum and cymbal sounds.

To capture the snare drum sound, many microphones were auditioned, including both dynamic and condenser. All the "usual" snare drum microphones were auditioned: Shure SM57, Shure Beta 56A, Sennheiser MD421, Sennheiser E904, AKG C519M, and Audix I5. However, what ultimately sounded best in the room and in the context of tracks surprised everyone: a CAD TSM411 (a budget microphone usually sold in a drum microphone bundle) on the snare top and a Shure SM57 on the snare bottom. The top snare microphone was positioned at the 10 o'clock position (relative to the seated player) and the bottom snare microphone was positioned at the 7 o'clock position, immediately under the snare bed.

To capture the tom sound only one microphone was auditioned and found to be immediately acceptable, the Sennheiser MD421. A microphone was placed over the 10" tom at the 1 o'clock position and over the floor tom at the 5 o'clock position. Through trial-and-error experimentation, it was determined that placing a microphone on the resonant head of each tom was unnecessary.

A Sennheiser E914, used to capture the hi-hat sounds, was placed between the two pairs of hi-hats used. The primary hi-hat was situated in the customary location just outside of the snare drum and the secondary hi-hat was positioned just below and to the right of the primary hi-hat, nestled between the snare drum, rack tom, and primary hi-hat. Initially, it was thought that using separate microphones for each pair of hi-hats might yield the most beneficial results, but it was quickly determined that the hi-hats were in close enough proximity as to make the second hi-hat microphone unnecessary. Additionally, the second microphone only created phasing issues and added sonic bleed from other close sound sources.

To capture the entire drum set, a pair of Earthworks QTC50mp were used over the right and left side of the instrument, in line with each other over the lateral midline, approximately 40" above the snare drum. Initially, a stereo pair of Shure KSM44A microphones were set up in the typical X-Y pattern over the drummer's head, but this was determined to be ineffective. The KSM44A microphone was too "bright," did not capture enough of the warmth of the kit, and made the cymbals sound harsh and brittle. Additionally, the X-Y pattern did not provide enough sonic space in the realization of the drum set sound.

A room microphone was also utilized. An Electro-Voice RE20 was set up directly in front of the drum set, approximately 12' from the front of the bass drum at a height even with the plane of the 10" rack tom. This position was determined by simply listening to the sound of the drum set while moving the microphone around in the room. In a matter of minutes, it was established that this location of the microphone would yield the sound I felt was most likely to be useful in adding character to the close-microphone sounds of the drum set. The intent in using the room microphone at all was that the early funk drumming recordings were generally recorded simply using one microphone on the bass drum and one overhead. This combination of microphones created a mono image of the instrument that was imbued also with the sound of the room, relative to the location of the drum set. The sounds recorded by the room microphone have proven useful in providing depth, color, and some amount of "grit" to the overall drum sound.

In order to get the analog sound from the microphones into the DAW, a Presonus StudioLive 16R interface was used. The interface features a 48khz sampling rate[47] and a 24 A/D/A bit depth. Although there are certainly interfaces that are capable of capturing audio at higher sample rates and bit depths, it is unlikely that the higher sample rate or bit depth would ever be appreciated by the casual listener and is not likely of any real concern to the discerning listener, particularly after the sounds have been processed, mixed, and mastered[48]. Moreover, since the aim of this particular recording is to try and recreate and recontextualize, on some level, the sonic qualities of those early funk recordings, employing too much technology or

[47] Though the audio interface can capture audio at a resolution of 48kHz, a sample rate of 44.1kHz was used.

[48] Typical CD-quality audio resolution is 44.1kHz and 16-bit depth.

technology that is state-of-the-art may be counterproductive, as many early recordings were done on simple 4-track tape recording devices, and sometimes only on one track.

The DAW used to record, edit, and initially process the audio recordings was Presonus StudioOne 4. The StudioOne DAW platform is relatively new compared with DAWs such as ProTools, Cubase, Cakewalk, and Logic. However, this DAW, like many offered today, is capable of any task an audio engineer might need to complete. And because StudioOne is a relatively new DAW (initially released in 2009), its GUI is intuitive and easily navigable compared with older DAWs, whose architects continue to add code and functionality over a multitude of previous generations' versions.

Issues with the Initial Recording of *Hybridization*

At the internal evaluation that took place on-site at the University of Salford in June of 2019, it was determined that the nature of the recorded drum sounds was not going to be appropriate in the intended context of the *Hybridization*. The initial thinking behind the drum sounds was that they should have a certain amount of "life" or ambience to them so that one might be able to hear the environment in which they were recorded. This initial thought was informed by sampled drum sounds used in early hip-hop recordings, where a certain amount of ambience can be heard in the drum performance. However, once a rough mix was produced it was determined that the drum sounds that had been captured would not easily fit within the aesthetic context provided by the DAW produced tracks.

The drum performances initially captured had far too much ambient room sound to sit effectively in the mix. This was due in large part to way in which these sounds were recorded and not the performances themselves. The use of a room microphone and very little acoustical treating of the room led to very resonant sounds being captured. And although these sounds were not objectionable in and of themselves, there was no way to remove the objectionable resonance in post-production. Therefore, it was determined that the original performance would be deleted, and the 12 drum performances would be re-recorded.

In the second round of recording, a significant amount of time was devoted to curtailing the resonance of the recording environment, though the same microphones and microphone placements were used. The drum set was relocated from its original location and placed in front of a wall treated with acoustically absorbent foam at a distance of about four feet with

acoustic baffles placed in front of, on the right and left sides of, and above the drum set. The baffles were approximately six feet in height and constructed of heavy packing blankets, and encircled the drum set almost entirely to the wall. The baffle above the drum set was 2' square and placed directly above the overhead microphones. Essentially, the recording environment was reduced from 30' x 20' with 11' ceilings to 15' x 8' with a 6' ceiling. This had the effect of making the recorded drum sounds far more "punchy" and more immediate with very little room resonance. The resonance that does exist is primarily as a result of the drums vibrating sympathetically with one another.

Hybridization: The Mixing/Mastering Process

In order to achieve a recorded product that would best illustrate the ideas presented in this document, the recorded material would have to be mixed and mastered by someone intimately familiar with the genres being recorded. As such, I reached out to friend and colleague Hamacide (Yusuke Hama) of Twin Capital Records. Hamacide's knowledge of current performance practice as it applies to the production of beat music is already industry recognized. Hamacide spent years working alongside artists such as Prefuse 73 and LEYODE. As a producer, Hamacide's Tokyo-based label has garnered attention with his collection of international artists.

Prior to beginning the mixing process, several conversations were had whereby we discussed the intended aesthetic and potential outcomes of the recording. My aim was to have the drum sounds work within the context of each track, and I was going to allow Hamacide the freedom and flexibility to make that happen in the way he felt was most appropriate. The mixing process was a bit slow to start and involved many mixes being sent back to me with follow-up notes being sent back to Hamacide. However, once he was able to find an approach that worked and I was happy with, the process moved much faster and efficiently.

One issue that was encountered repeatedly was that I felt the drums—and to a lesser degree hi-hat and ride cymbal sounds—were not present enough in the mixes. Hamacide encouraged me to listen to music currently being produced in the genre for reference[49], and indeed, he

[49] Tracks auditioned for comparison include: A$AP Rocky "Babushka Boi" (2019), Post Malone "Wow." (2019), J. Cole "Middle Child" (2019), Tyler, The Creator "Earfquake" (2019). Many other tracks were

was correct. My preconceptions of what hip-hop sounds are/were was not as informed as I believed. Perhaps this is result of my own selective attention (I defer to hearing drums and percussion before almost anything else) or my own confirmation biases (hip-hop drums are always loud in the mix). Regardless, the resulting mixes had the appropriate drum aesthetic and were far more convincing than I had ever hoped to achieve.

It is interesting to note here that the drum sounds and instrumental arrangements that came back post-mixing and mastering had little in common with the sounds that were originally sent to Hamacide for the mixing process. This is in some ways desirable, in that the drums most certainly have a unique place within the mix and have achieved a sonic characteristic that propels the character of each track. And his editing choices certainly helped to thin out the tracks in a way that allowed for that which is substantive to be more effective and appreciated. However, it is frustrating in that so much time and effort was spent trying to achieve unique and characteristic sounds at source. Hamacide assures me that no sound replacement was utilized in the mixing/mastering process of the record and that all the sounds were affected via filters, EQ, compression, and reverbs. As such, it begs the following question: is affecting the sound of an instrument at source a practice best left for live performance rather than studio recording? Or, is this an indication of the limitations of the studio in which the recording was made, either technologically or in terms of the skills of the engineers and myself? Certainly, drum sounds generally require a bit of treatment to be effectively recorded, though this is usually limited to tuning, tone control, ambience, etc. There is absolutely no question that, with the advent of DAWs and audio plugin technology, any sound can be twisted and morphed into almost any other sound, quite literally. Perhaps this is where the true art of recording now lies: determining what needs to be captured at sources versus what can be created/manipulated in post-production.

The Funk Record: *Analogous to Analog*

Source material for the *Analogous to Analog* record was conceived of and compiled in several ways that included improvising with musicians in the recording studio and developing

auditioned as well, but this short list constitutes an adequate sample of the production values suggested to me by Hama.

source material produced by Ryan Noise. The writing and conception of the *Analogous to Analog* record began in earnest in April of 2019, with tracking beginning in late July of 2019.

Conceptually, the goal of this recording was to highlight the evolution of funk drumming vocabulary from the 1960s to and through current trends. Of course, the scope of the goal cannot be wholly realized within the confines of the recording project at hand. However, it is believed that by offering examples from each decade, the audience may be able to glean an understanding of the ways in which the drumming vocabulary evolved in its cyclical and reciprocal nature with the DJ and beat producer. To this end, great care was taken to create musical palates on which this funk drumming vocabulary evolution could be expressed. It should be noted, however, that because the vocabulary from decade to decade evolved subtly, it may be difficult for the non-drummer/aficionado to hear a significant difference between one decade's rhythmic vocabulary and another's. Therefore, an effort was made to place the drumming within a sonic context in each track that would help to identify that track with a particular decade. Because the evolution of produced drum sounds is not always as obvious as the evolution of keyboard/synth sounds or guitar sounds, or as easy to date, an effort was made to use keyboard/synth and guitar sounds indicative of the musical eras between the late 1960s and now.

The Creative and Recording Process

Prior to improvising or "jamming" any of the musical ideas that would be incorporated in the *Analogous to Analog* record, many discussions were had amongst the musicians and Ryan Noise. We wanted to try and recreate sounds, feels, tempi, and grooves like those found on records by seminal artists from the decades represented. For instance, we felt it crucial to begin with sounds and feels like those coming from James Brown, Sam & Dave, The Isley Brothers, and the Winstons in the 1960s, as they were largely responsible for the birth of funk drumming in a pop radio context. Similarly, we chose bands and artists from the 1970s, 1980s, 1990s, and 2000s that seemed to represent (via Billboard charting and historical relevance) each decade to use as inspiration for source material.

Similar to the process used in the production of source materials for the *Hybridization* record, Ryan Noise produced all source material tracks in Ableton Live. Noise's source materials would often include percussion, bass, guitar, keyboard, horn, and occasionally vocal tracks.

Additionally, a sparse drum track was provided to give context to the other instrumental tracks. This provided drum track was always replaced by a live drum performance. Bass, guitar, and keyboard performances were also often layered in the tracks if not entirely replacing the original track(s) altogether.

The source materials provided by Noise were seemingly produced in a stream of consciousness manner, which is to say, the materials seem to be composed in a linear, "run-on-sentence fashion" with little regard for form or function. This could be a result of the way in which the creative parameters were communicated to him as much as a result of his compositional techniques. As such, the source materials required much editing in the way of arranging in order to create anything that might resemble a funk track written in the traditional mode of musicians co-creating in a room together. To that end, many conversations were had in the studio about how best to organize and arrange the source material to create the most organic and natural music possible. The tracks that were conceived by improvising in the studio came together in an organic way, with musicians sharing ideas and then editing those ideas in real time via repeated rehearsing of given sections within a track. This process, although natural to all involved, was far more time-consuming than having source materials provided and then editing and arranging those materials. Furthermore, having nearly fully realized ideas presented for arranging and editing provided the musicians with more time to focus on the creation of stylistically appropriate parts and sounds and tones unique to each track. For instance, on the *Cerebral Flow* (A3.) track, the guitar parts were recorded solely against the original source material. The guitarist, Derek Carvotta, played what he felt was appropriate for this track — a guitar part heavily influenced by Eddie Hazel's performance on the 1971 Funkadelic track "Maggot Brain" (1971). An interpretation of this sort had never occurred to me and led, in my opinion, to one of the more successful tracks in the collection[50].

Instruments Used in Recorded Performance

Because the nature of the *Analogous…* record required much less altering of sounds at the source, far fewer implements were used in the treatment of the drums. The one exception to this was the use of several materials that were placed on the snare drum to curtail its

[50] Recording and rehearsal segments of "Cerebral Flow" (A3) can be seen in Digital Asset (R3.).

resonance to create a sound similar to that found on many 1970s and 80s funk recordings. The implements used consisted primarily of mylar discs of varying thickness produced by the Big Fat Snare Drum company. A handkerchief or other piece of light fabric might also be placed on the snare drum depending on the desired effect. Similarly, the toms would occasionally be affected by applying damping gel pads (MoonGel) produced by the RTOM company to create the muted, "thuddy" tom sounds prevalent in the 1970s and 80s.

The recording process for the *Analogous…* record was far more streamlined than that of the *Hybridization* record, due in large part to having worked out many of the "hidden" issues encountered in that recording. Typically, a recording session would begin with the musicians reviewing the track that was next to be recorded. As before, the musicians were supplied with a mockup of the track so that they might experiment with parts and sounds prior to arriving at the studio. Often, the musicians would come in with preconceived ideas of what the track may ultimately be. However, once all the musicians were gathered in the studio and their ideas were brought to bear simultaneously, concessions had to be made and compromises agreed upon. This process usually took no more than 45 minutes to an hour before everyone was prepared to begin recording. Then, all that remained was to play along with or over the preexisting tracks.

Table 2. Instruments and Affectations: Analogous to Analog

Track	Snare(s) Used	Snare Effects	Cymbal Effects	Other Items
1.	1. Ludwig LM400 2. Gretsch G4610HB	1. Evans E-Ring 2. Evans E-Ring	Ride: Stack Ring Mini Bell	MoonGel tab on ride and crash
2.	1. Ludwig LM400 2. Gretsch S1-0610	1. BFSD – Steve's Donut 2. MoonGel	Ride: Stack Ring Mini Bell Hi-Hat: Meinl Ching Ring	MoonGel tab on ride and crash
3.	1. Gretsch NC1-6514 2. N/A	1. BFSD – Steve's Donut	N/A	MoonGel tab on ride and crash
4.	1. Ludwig LM400 2. Gretsch S1-0610	1. BFSD – HALOS 2. MoonGel	Ride: Stack Ring Mini Bell Hi-Hat: Meinl Ching Ring	MoonGel tab on ride and crash
5.	1. Gretsch G4610HB 2. Gretsch S1-0610	1. Evans E-Ring 2. MoonGel	Hi-Hat: Meinl Ching Ring	MoonGel tab on ride and crash
6.	1. Gretsch NC1-6514 2. Ludwig LM400	1. BFSD – Steve's Donut 2. Evans E-Ring	N/A	MoonGel tab on ride and crash - Cowbell
7.	1. Gretsch G4610HB 2. N/A	1. MoonGel	N/A	MoonGel tab on ride and crash
8.	1. Ludwig LM400 2. Gretsch NC1-5514	1. BFSD – Original 2. Evans E-Ring	N/A	MoonGel tab on ride and crash
9.	1. Gretsch NC1-6514 2. N/A	1. BFSD – Original	N/A	MoonGel tab on ride and crash
10.	1. Gretsch G4610HB 2. N/A	1. MoonGel	N/A	MoonGel tab on ride and crash
11.	1. Gretsch NC1-6514 2. N/A	1. BFSD – Original	N/A	MoonGel tab on ride and crash
12.	1. Ludwig LM400 2. N/A	1. BFSD – Steve's Donut	N/A	MoonGel tab on ride and crash

The Recording Setup: *Analogous to Analog*

Configuring the room for the recording of the drums was far more efficient during the recording of the *Analogous…* record, due in large part to having worked out many of the sonic pitfalls encountered during the recording process of the *Hybridization* recording. The drums were set up on one end of the studio, approximately 4' off a wall treated with acoustically absorbent foam. The drum set was then nearly completely surrounded on all sides by 6' tall baffles made of heavy packing blankets. Additionally, a baffle measuring 2' square made of acoustical foam was placed above the overhead microphones essentially reducing the size of the recording environment to 15' x 8' with a 6' ceiling.

The microphones and microphone placements used in the recording of *Analogous…* are very similar to those used in the recording of the *Hybridization* record. On the kick drum a Shure Beta 52 and Shure KSM44A were used. The Beta 52 provides the bulk of the kick drum sound with the KSM44A providing a bit of character and frequency response that the Beta 52 lacks. The snare drums were captured with Shure SM58 microphones (top and bottom) and the toms with Sennheiser MD421 microphones. The hi-hat was captured with a Sennheiser E914 and a pair of Earthworks QTC50mp were positioned over the drum set using a standard stereo bar arranging the microphones in an X-Y configuration. After the re-recording of *Hybridization*, it was determined that using the overhead microphones in the X-Y configuration was the easiest way to avoid phase issues.

8: Conclusion

Critical Reflections on the Recorded Materials:

Recording 1: *Analogous to Analog*

The impetus for *Analogous to Analog* was to present a selection of tracks that would capture the aesthetic and rhythmic vocabulary of funk drumming within the context of recordings sampled from the mid-1960s through the mid-2000s. Admittedly, this is a range of time too broad and too expansive to reasonably capture or describe within the 12 songs presented on the *Analogous…* recording. However, much thought and consideration was given to the sounds of the drums and patterns employed within each track in hopes of adequately representing a particular era or style within the funk drumming evolution.

The tracks "Ya Heard Me?!" (A1.), "Dog Whistle" (A2.), and "What Have I Done?" (A4.) were created with the 1970s funk aesthetic in mind. The sound of the drums on these tracks is somewhat dry with minimal reverb applied, similar to the drum sound one might hear on recordings like "Luv N' Haight" (1971) by Sly and Family Stone, or "What Comes Funky" (1975) by Parliament. Similarly, the drum vocabulary employed within these selections from *Analogous…* is consistent with drumming patterns heard by drummers on other funk recordings produced during this time period (late-1960s – mid-1970s). The tempi on these tracks are moderate, ranging between 85bpm and 116bpm, though even the quicker tracks have a relaxed, "back of the beat" time-feel indicative of the funk music these selections intend to mimic.

In order to achieve the short, dry sound reminiscent of 70s era funk recording, a number of different materials have been applied to the drums during recording. Most often, products from the Big Fat Snare Drum company were utilized on the snare drums and, to a lesser extent, handkerchiefs and hand towels. Because smaller rack toms (10" and 12") were used in the recordings and the sound from toms of this size tend to have a shorter sustain to begin with, only minimal amounts of tone control were required. As such, a half of a MoonGel tab, or occasionally a whole tab, might be applied at the extreme edge of the drum to curtail unwanted resonances. For the larger floor toms (14" and 16"), Big Fat Snare Drum rings were used consistently throughout the recordings on *Analogous….* The larger floor toms tend

to resonate more than the smaller toms and as such required a more "heavy-handed" approach in curtailing their resonance.

To emulate the lower fidelity funk recordings of the 70s, materials are applied to the cymbals as well. Most often items were applied to the ride and hi-hat cymbals. On the ride cymbal, a Stack Ring "Mini-Bell" was placed atop the ride cymbal bell, which had the effect of mitigating the resonance somewhat as well as creating a bit of a distorted cymbal sound at source. In other instances, a Meinl "Ching Ring" was applied to the ride cymbal. It was simply laid over the bell of the ride cymbal, which had the effect of again mitigating the resonance to a degree and also creating additional jingle noise produced by the sympathetic vibration of the ride cymbal activating the "Ching Ring.[51]"

The tracks "Cerebral Flow" (A3.), "D Rock" (A5.), and "Gaitor Bait" (A6.) are inspired by the psychedelic funk rock bands that came to fruition in the late-1960s through late-1970s – bands such as Funkadelic (*Maggot Brain, 1971)*, WAR (*The World is a Ghetto, 1972*), Headhunters (*Straight From The Gate, 1977)*, Curtis Mayfield (*Superfly, 1972*), Eugene McDaniels (*Headless Heroes of the Apocalypse, 1971*), or The Temptations (*Solid Rock, 1972*). "Cerebral Flow" and "D Rock" in particular are responses to the tracks "Maggot Brain" by Funkadelic and "Pusherman" (1972) by Curtis Mayfield, respectively. "Gaitor Bait" is inspired by Herbie Hancock/Headhunters, and specifically the track "Chameleon" (1973). Both tracks are heavily influenced by the 3:2 clave pattern and feature instrumental ostinati over which the tracks develop. Both also employ improvisation to a large degree within the drumming performances, belying the jazz/fusion influences where the drummer is not simply playing a 2- or 4-bar pattern on repeat but rather reacting to instrumental performances happening in real time, adding to the conversational nature of the instrumental performances.

Also of note is the use of a multitude of percussion accompaniment tracks within the 1970s inspired tracks. A significant part of the 1970s funk aesthetic was the inclusion of Latin percussion in form of hand drums (conga, timbales, and bongos), bells and blocks, and shakers. The significance of these timbres and rhythms within this musical context cannot be

[51] A complete listing of drum and cymbals used and materials applied to instruments per recorded track is provided in Section 6.

overstated. Without these sounds and rhythms, the tracks on *Analogous…* or the tracks that served as their inspiration would not have grooved nearly so effectively. It is interesting to note, however, that these sounds and rhythms are not always appreciated in the conscious foreground of the listening experience and do not often become obvious or overtly appreciable until subsequent listening experiences.

Several of the tracks on *Analogous…* are inspired by funk tracks and artists working in the 1980s. "Sine Pollution" (A8.), "Glamtastic" (A9.), and "Tinkerbell's Cameo" (A10.) are an endeavor to recreate the 80s aesthetic in terms of drum sound production and rhythmic vocabulary. The drum production aesthetic on recordings by bands such as Chic, The Gap Band, Brick, Prince, The Time, Zapp, and Cameo tended to be much more articulate and often employed both acoustic and electronic drum and percussion sounds simultaneously to great effect. The kick and tom sounds were deep, punchy, robust, and generally had more high-frequency attack sound than those heard on 1960s and 70s recordings. The snare drum sounds on these recordings most certainly reflected the influence of the synthetic snare drum sounds that were then available from devices like the Roland 808/909 or from samplers that allowed for the tailoring of the snare drum sound in a way that could make the snare drum sound like a burst of white noise or a whip crack – or anything in between the two. No electronic percussion was employed during the recording of *Analogous…*, and as such all the drum sounds are a result of affecting the sounds at source and effects applied in post-production.

The remaining tracks on *Analogous…* are inspired by funk recordings from the 1990s and beyond. "Calvin and André (Go to the Club)" (A7.), "Chill Terrence" (A11.), and "Ducky's Revenge" (A12.) are examples of tracks inspired by bands/artists such as Terrence Trent D'Arby, The Brand New Heavies, En Vogue, Groove Collective, Soul II Soul, Jamiroquai, Fishbone, Red Hot Chili Peppers, Mother's Finest, and Living Colour. Though each of the tracks from *Analogous…* representing the 90s funk aesthetic have their own unique sound in terms of drum production, time-feel, and style, the common denominator is that the drums in each instance have a sound that is more organic, less processed, and more forward in the mix.

The track that perhaps stands out the most in the collection is "Ducky's Revenge," which is quite obviously influenced by the Red Hot Chili Peppers' "Suck My Kiss" (1991) track from their 1991 release, *Blood Sugar Sex Magik.* "Ducky's Revenge" is an outlier within the scope

of *Analogous…* because it is most definitely a funk-rock track while all the others are inspired more by traditional R&B, funk, and fusion artists. This is not to imply that the funk-rock genre is somehow less-than or not as prevalent in commercial terms, but rather that the production and aesthetic properties surrounding drum sounds in the genre so closely align with those found in typical rock recordings of the time that what sets the track apart has more to do with the vocabulary employed than the production values. However, and to be clear, there certainly are distinct characteristics in funk-rock drum production. Prototypical drum sounds such as these can be heard on recordings by Red Hot Chili Peppers, Fishbone, Incubus, 311, Living Colour, Primus, 24-7 Spyz, and Infectious Grooves.

The recordings on *Analogous to Analog* are supplied in evidence of assertions made within this thesis and provide a clear description of funk drumming patterns used within a variety of funk music contexts. Furthermore, performances on this recording also demonstrate the ways in which the sound of the drum set performance may be affected at source to best emulate the various funk music aesthetics employed within the framework of this recording, both pre and post technologically-mediated drum production. As such, this recording serves to further strengthen my assertion of the cyclical and reciprocal relationship between the live funk drummer and the DJ/beat producer.

Recording 2: *Hybridization*

The impetus for *Hybridization* was to present a selection of tracks that would represent the recontextualized aesthetic of acoustic drums and funk drumming vocabulary within a contemporary hip-hop context (in the broadest scope of the genre). Again, 12 tracks cannot adequately describe all of the changes and influences that have manifested sonically or rhythmically since the advent of the drum machine, sampler, or DAW. However, much consideration was given to the composition of the tracks that make up *Hybridization* in an effort to highlight significant changes in aesthetic and rhythmic vocabulary development.

As a result of advances in DAW and plugin software, the influence of drum machine programming, performances constructed via samplers, and extensive editing capabilities now available within any of these software/hardware devices, the acoustic drum sound palate and rhythmic performance can now be tailored or constructed to be anything within the artist's imagination. This is both exciting and daunting at once. While it is now possible to recreate

almost any electronically-produced drum sound acoustically to some degree, and advances in drum performance techniques are pushing the boundaries of what a drummer can achieve rhythmically, the live drummer must still make decisions about what is feasible (physically, logistically, technologically), appropriate (musically, aesthetically, etc.), and/or relevant. To that end, when hearing *Hybridization* it is my hope that the listener will be able to appreciate the affected sounds at source, the ways in which the production effects contribute to the drum aesthetic, and the recontextualized rhythmic vocabulary.

Three of the tracks on *Hybridization* are heavily influenced by the production on the Beastie Boys' *Paul's Boutique* (1989) and *Check Your Head* (1992) albums, produced by the Dust Brothers (Michael Simpson and John King) and Mario Caldato Jr. ("Mario C.") respectively. The unifying traits that exist in both *Paul's Boutique* and *Check Your Head* are the rich and imaginative use of sampling, a lo-fi, gritty sonic aesthetic, and an obvious affinity for funk drumming patterns. Similarly, the production on the tracks "Left Coast Hang" (H1.)[52], "Stupid Gloves" (H2.), and "Vato Loco" (H3.)[53] is intended to reflect these influences. To achieve this, many DJ scratch sounds, percussion loops (sampled or programmed), and effects applied to drums at source were employed. Most often, materials are applied to the snare drums to create a distortion or "gated" effects on the snare drum to more closely emulate the lo-fi sampled drum sounds found on the recordings used as inspiration. These products include the Dream Cymbals "Naughty Saucer," "ReFX Crop Circle," the Stack Ring Percussion "Mini Bell," Big Fat Snare Drum "Quesadilla," and "Steve's Donut," and the LP "Raw Sound Enhancer Snare." Any of these products alone or in combination can dramatically affect an acoustic snare drum's sound – altering it from "typical" to anything between uncharacteristic and extraordinary[54].

Other sources of inspiration for *Hybridization* include Massive Attack, Portishead, UNKLE, Hooverphonic, and Sneaker Pimps. The tracks "Head in the Hole You Dug" (H4.), "That's What You Think!" (H5.), "Morty in Manchester" (H6.), and "Only the Ones You Know About" (H7.) are directly influenced by the sound typified within the Trip Hop genre[55]. Drum

[52] Rehearsal segments of "Left Coast Hang" (H1.) can be seen in Digital Asset (R8.).

[53] Sound check and rehearsal segments of "Vato Loco" (H3.) can be seen in Digital Assets (R10.) and (R11.).

[54] Rehearsal segments of "Stupid Gloves" (H2.) can be seen in Digital Asset (R5.).

[55] Rehearsal segments of "Morty in Manchester" (H6.) can be seen in Digital Asset (R4.).

performances in this genre tend to be heavily affected. Whether sampled, programmed, or recorded live, the drum aesthetic is always presented in a unique and stylized manner. Because the Trip Hop genre is broad, it is impossible to quantify the aesthetic or say that the production is always handled in a specific manner. However, what can be said is that the drum sounds are integral to the genre and as such are most often heavily processed. To this end, the drum sound on *Hybridization*, and on the aforementioned tracks specifically, has been heavily affected at source and in post-production.

On the track "Head in the Hole You Dug," two snare drums are used during the performance/recording. The primary snare employed is a Tama 6.5 x 14 bronze snare played upside down (with the snare on top). To play the drum in this way, the resonant head is removed and replaced with a batter head under the snares and no head was placed on the top of the drum[56]. The resulting sound closely resembles that of a Roland 808 snare drum. The secondary snare on the drum set is a Gretsch 7 x 12 ash snare tuned quite high. The primary snare is employed throughout the track until the 2:21 mark when the secondary snare is employed for the "outro" of the track. Over both snare performances a handclap can be heard as it is triggered via the snare performances within the DAW. This further stylizes the snare sound in an attempt to recreate the sounds heard on the Trip Hop source materials. Additionally, on this track one can hear the affected floor toms being played in a way that is intended to emulate the tuned Roland 808 bass drum/tom sounds.

Further adding to the stylized sound of "Head in the Hole You Dug," "That's What You Think!," and "Only the Ones You Know About" is the use of multiple sets of hi-hat cymbals within the drum set configuration. And, in addition to the multiple hi-hats, a cymbal stack comprised of a 12" china-type cymbal layered with a 10" splash cymbal is used to further augment the hi-hat sound array. It is quite common in contemporary hip-hop to employ multiple hi-hat sounds either in sequence or simultaneously. In an effort to recreate this type of hip-hop production, I play all three of the hi-hats and the cymbal stack as if they were a single instrumental part. The effect of playing all these sounds at once can create the illusion of the pitch of a single hi-hat being modulated in real time.

[56] A sample of the performance of this drum can be heard on Digital Asset (R2.).

The *Hybridization* tracks "To Sleep, Too Dreamy" (H8.), "Saturday Night Revelation" (H9.), and "We're Coming for You" (H12.) are influenced by current trends among artists who blend funk and hip-hop influence with live instrumental performance, though are not necessarily bound by a particular genre. These artists/bands include MXXWLL, Anomalie, Louis Cole, Corey Henry, Sungazer, Thundercat, Flying Lotus, and Hiatus Kaiyote. The common thread that connects these artists/bands is their understanding of hip-hop production values, the funk rhythmic vocabulary, and a willingness to blend acoustic and electronic performances with sampled materials or materials produced within the DAW. The aforementioned tracks from *Hybridization* are constructed in an effort to not only employ funk/hip-hop rhythmic vocabulary in a recontextualized manner, but also demonstrate how an acoustic drum set can be affected at source to more closely emulate those hip-hop drum sounds that may have originally been either programmed or sampled and manipulated.

Two of the tracks on *Hybridization* are influenced by the current Trap music genre and the rhythmic influences of J Dilla's MPC performances. The tracks "It's a Trap" (H10.) and "Dis Guy Right Here?!" (H11.) both employ drumming performances that are directly influenced by the production aesthetic and rhythmic performances found within Trap and J Dilla's music. Specifically, the down-tempo vibe and stylized hi-hat performance on "It's a Trap" are direct reflections of the Trap style, but perhaps more heavily influenced by J Dilla's off-kilter, unquantized MPC drum performances. One can hear the hi-hat patterns affected performance at the 0:44 mark. The hi-hat pattern almost seems to swing a bit while the bass drum and snare drum performances remain metrically even within the 16th-note grid. On "Dis Guy Right Here?!" one can hear two distinct time-feels being employed, one a laidback and swung half-time feel and the other a metrically even half-time feel with a simultaneous heavily-syncopated, double-time hi-hat part performed over top. This type of rhythmic performance is commonplace in hip-hop as well in the recontextualized hip-hop genres that are propagating seemingly by the day[57].

The recordings on *Hybridization* are supplied in evidence of assertions made within this thesis and provide a clear description of funk drumming patterns recontextualized within a variety of hip-hop-influenced funk music contexts. Additionally, the sounds of the drums

[57] Rehearsal segments of "Dis Guy Right Here?!" (H11.) can be seen in Digital Asset (R7.).

affected at source and in post-production are directly in reference to those found in contemporary examples of music within genres of this type. To that end, the recorded examples on *Hybridization* serve to strengthen the assertions contained within this thesis and support my hypothesis regarding the cyclical and reciprocal relationship between the live funk drummer and the DJ/beat producer.

Recording 3: The Lecture Recital

The lecture recital in support of this DMA endeavor occurred on Saturday 29 August 2020. During this lecture recital, I presented my research and performed selections from both the *Analogous to Analog* and *Hybridization* recordings to illustrate the concepts and rhythmic vocabulary discussed within the thesis.

I originally intended to use all the musicians who had contributed performances on the recordings in the live performance segment of the lecture recital, but due to COVID-19 restrictions was allowed only a trio. As such, many of the additional instrumental performances were performed/played back via Ableton Live. Only live guitar, bass, and drums were presented in the lecture recital. Though performing with pre-recorded media is commonplace today and the necessary technology to do so is common as well, it was my intent to reproduce the recordings completely live for the purpose of letting the tracks "stretch out" and incorporate more improvisation. However, because the fixed media accompaniment is static, the drumming performances, while effective, were not able to fully employ the spontaneous, conversational nature of a truly live performance.

In preparing the performances for the lecture recital, it occurred to the trio that none of these tracks had ever been performed in ensemble this way. When the tracks were recorded in the studio, many of the performances happened as overdubs, with the musicians simply playing along to performances already recorded. As such, recreating these tracks that had never been rehearsed in ensemble, but only as individual performances, proved challenging, though in some instances it did allow for a greater freedom of expression. For instance, when we performed "Gaitor Bait" (LR4) at the lecture recital, it most certainly had greater dynamic contrast and a more pronounced "conversational" interplay between the musicians present as a result of the trio's ability to hear and react in real time to musical stimuli.

I feel the lecture recital was effective in its delivery both of the research materials and the live recontextualization of the funk/hip-hop rhythmic vocabulary. Additionally, the lecture recital provided an excellent opportunity to demonstrate how I was able to affect drum and cymbal sounds at source, in real time, within a variety of musical contexts. When sampling the recorded materials on *Analogous…* and *Hybridization,* it is not always obvious to what extent the sound is a result of affectation at source versus what is a result of effects applied in post-production. As such, having the ability to demonstrate and narrate the processes for affecting the various drum and cymbal sounds at source in real time proved effective for the audiences that have seen the recorded lecture recital thus far.

Final Thoughts

The creation of entirely new, never-before-heard music within the boundaries of an educational experience such as this has been exceedingly rewarding. The acquisition of new knowledge, the deepening understanding of concepts, and the broadening of awareness in regard to not only the academic pursuits but also the musical aesthetic, has provided much opportunity for personal growth and reflection. The effort to establish legitimate, concrete connections that have previously been taken largely for granted between funk drumming and hip-hop music has proven to be a challenging, illuminating, and rewarding experience.

Findings:

At the conclusion of this DMA experience, clear connections have become apparent between funk drumming and hip-hop, as many recordings have been explored, interviews have been conducted, academic sources reviewed, and performances given and recorded to demonstrate the connections. The cyclical and reciprocal relationships between funk drumming and hip-hop has proven to reach beyond the obvious sampling of drumming patterns to include an aesthetic relationship as well – one where live drummers and DJ/beat producers are influenced by each other's output in terms of both timbre and rhythmic vocabulary. And though the relationship is certainly bi-directional, it is clear that the majority of the influence flows from the technologists to the live drummer. It is the live drummer's response to the use of technology that is most evident in the use of materials to affect the acoustic drum set, technology applied to the acoustic drum set (via triggers, etc.), and the evolution of rhythmic vocabulary as a result of programmed/technologically-mediated drumming patterns. This

directly supports the theory of a cyclical and reciprocal relationship between live drummers and DJ/beatmaker/technologists.

Critical Reflection:

The influence of the Afro-Latin clave rhythms on the funk drumming rhythmic vocabulary (and by extension hip-hop rhythmic vocabulary) appears to be beyond doubt. Other than the interview materials gathered for this document, no other materials (scholarly, peer-reviewed, or otherwise) have been located in support of this assertion. However, the correlations illustrated by the provided notated examples within this document seem evidence enough to warrant more study in the evolution of clave and its influence on pop music.

The 24 recordings produced within the *Analogous to Analog* and *Hybridization* recordings stand as examples of funk drumming used in both conventional and recontextualized instances. These connections are not always immediately obvious, because the drum performances on the recordings are striving to bridge the gap between the original funk drumming aesthetic and modern hip-hop production values. For example, the tempi employed in hip-hop production can often be considered slow and not particularly danceable by original funk music standards. As such, current hip-hop producers will employ a hi-hat or percussion track that sounds at twice the tempo of the bass drum and snare drum performance. In order to recognize the funk drumming pattern utilized, the listener will on occasion have to hear the drum set performance not only as a whole, but also as a collage, with the bass drum and snare drum performance constituting the funk aesthetic and the hi-hat performance as a separate percussion voice. Other times, the production of the drum set sounds has been so affected by the use of materials applied to the drum set or in post-production that the drum sounds do not resemble those found on early funk recordings at all. Again, as the scope of this research/performance project is quite broad, the amount of information contained within the recordings can be overwhelming at first listen. However, it is hoped that the listener will be able to appreciate not only the variety of rhythmic vocabulary employed and time-feels represented, but also the timbral nuances created by affecting drum and cymbal sounds at the source.

Though it could be argued that nothing revolutionary occurs on either the *Analogous…* or *Hybridization* recordings, when paired with the thesis a compelling case can be made, using

the recorded material as evidence, for the assertions presented within the thesis. *Analogous…* certainly highlights the evolution of funk drumming while *Hybridization* certainly demonstrates the use of funk drumming vocabulary, as well as its recontextualization within a contemporary, hip-hop-influenced context. And both recordings are effective in demonstrating the ways in which the sounds can be affected at source to emulate drumming sounds produced by/through electronically mediated means.

Original Contribution:

To date, no scholarly research materials have been sourced that would deem this thesis redundant or unnecessary. As stated previously, there is no shortage of materials on the social, cultural, and political phenomena surrounding either funk or hip-hop. However, there exists precious few sources that speak directly to the correlation between funk drumming and hip-hop, and none have been found to draw concrete connections between the two by illustrating the way in which the drummers influenced the DJ/beat producers who, in turn, influenced the modern drum set players.

Additionally, while there are multitudes of instructional books, DVDs, and YouTube videos on funk, R&B, and hip-hop drumming that will inform the reader on the vocabulary utilized within those genres, there exists little material describing the evolution of those patterns or the ways that they have been employed over time and through genres. In fact, it is remarkable that no document or media exists to date to fill this knowledge gap, given that so much of the vocabulary has been documented in so many different drum method books. Perhaps this is because drummers and musicians in the genres take it for granted or find it obvious. Numerous documents exist (usually in the form of non-scholarly articles, web content, etc.) describing the evolution of jazz and rock'n'roll drumming[58] but, by comparison, funk drumming seems to have been largely under-represented. It should be noted, however, that as jazz is now largely embraced as a viable subject for academic study, there exist many scholarly papers that address many aspects of jazz drumming performance and history.

[58] Rock Drumming Historical Texts: *Daniel Glass, The Roots of Rock Drumming. The Ultimate History of Rock'n'Roll Drumming: 1948-2000.* Jazz Drumming Historical Texts: Burt Korall, *Drummin' Men: The Heartbeat of Jazz.*

To this end, the ability to interview so many artists, authors, and experts in the field of funk and hip-hop drumming and hip-hop/EDM production was invaluable. The prevailing consensus gained by way of the interviews supports assertions that funk drumming vocabulary was indeed a primary catalyst in the evolution of hip-hop rhythmic vocabulary. Furthermore, insights gained with regard to the way in which live drummers affect their instrument as a way of not only creating a unique performance aesthetic but also as a means of emulating electronically created percussion sounds is irrefutable – as is the live drummer's evolved and heightened rhythmic vocabulary a result of the same influence.

Now completed, this thesis and its corresponding recordings and analysis should provide the reader with definitive examples, both academic and musical, that shed light on a subject whose parameters are seemingly open-ended, if not boundless. Through this DMA experience it has become clear that there are in fact more questions than answers, and what answers are available or can be deduced are oftentimes subjective or conditional. For instance, the correlation between the clave and the evolution of funk drumming, though seemingly obvious to some at this point, is still beyond the scope of definitive proof. The evidence certainly seems to bear out a correlation, but as the evolution happened organically and across time and geographic and cultural lines, no singular, serendipitous moment can be identified.

The rigor of this work lies in the collating of drumming vocabulary utilized by early funk progenitors, hip-hop/beat producers, the modern drum set artist, and also within the creation of original music to illustrate the vocabulary and timbral signatures identified as essential. Moreover, the responsibilities and challenges inherent within the production of two original recordings at a level on par with current professional standards alongside a third live recording cannot be overstated. The time, skills, and resources required to manage, facilitate, and ensure the success of a project of this scope is at the very least daunting and oftentimes overwhelming. The output, however, has proven to be effective and the experience has been enjoyable, educational, and inspiring.

What can be said definitively is that funk drumming was indeed a precursor to hip-hop and was quintessential in its development. Additionally, my experiences and research support my assertions about the cyclical and reciprocal relationship between the funk drummer and the hip-hop technologist.

Appendix 1:

Funk Drumming Recontextualizations

The following table details instances of early funk drumming performances that have been sampled and recontextualized in later hip-hop/EDM instances.

Table 3. Funk Drumming Patterns and their Recontextualizations

Original Composer	Track	Year	Sampled By	Track	Year
Steve Alaimo	Mashed Potatoes (Pt.1)	1962	Captain Funk	Twist & Shout	1999
James Brown	Night Train	1962	Afro-Rican	Give It All You Got	1987
James Brown	I've Got Money	1962	Will.I.Am	Go!	2003
James Brown	Papa's Got a Brand New Bag	1965	Angelo Ferreri	Papa's Dance	2018
Billy Preston	Uptight	1966	Deee-Lite	Groove is in the Heart	1990
Chuck Jackson	And That's Saying a Lot	1966	House of Pain	One for the Road	1992
Joe Tex	Papa Was Too	1966	Wu-Tang Clan	Wu-Tang Clan Ain't Nuthing Ta F Wit	1993
Joe Tex	Papa Was Too	1966	B.o.B.	Nothin on You	2010
Joe Tex	Papa Was Too	1966	Young MC	Roll With the Punches	1989
Lee Dorsey	Get Out of My Life Woman	1966	Biz Markie	Just a Friend	1989
The Mad Lads	Get Out of My Life Woman	1966	Funkdoobiest	Superhoes	1995
The Mad Lads	Get Out of My Life Woman	1966	Biz Markie	I'm the Biz Markie	1993
The Monkees	Mary Mary	1966	De La Soul	Change in Speak	1989
The Monkees	Mary Mary	1966	DJ Jazzy Jeff & The Fresh Prince	The Reverend	1989
James Brown	Cold Sweat	1967	Public Enemy	Welcome to the Terrordome	1989
Lou Donaldson	Ode to Billie Joe	1967	Lauren Hill	To Zion	1998
Sly & The Family Stone	Advice	1967	A Tribe Called Quest	Skypager	1991
Procol Harum	Repent Walpurgis	1967	Cypress Hill	Strictly Hip-Hop	1995
Ben E. King	What is Soul?	1967	Mr. Dibbs	Aneurysms	1998
Bill Cosby	Get Out of My Life Woman	1968	Cypress Hill	Stoned Is the Way of the Walk	1991
Tom Jones	Looking Out My Window	1968	Stetsasonic	Go Stetsa I	1986
Ramsey Lewis	The Mighty Quinn	1968	Arrested Development	U	1992

Iron Butterfly	Get Out of My Life Woman	1968	Black Moon	I Got Cha Opin	1993
James Brown	Say It Loud…	1968	Pete Rock & C.L. Smooth	They Reminisce Over You	1992
James Brown	Tighten Up	1968	Major Lazer	Jah No Partial	2012
James Brown	Tighten Up	1968	Photek	The Seven Samurai	1995
Sly & The Family Stone	Sing a Simple Song	1968	Dr. Dre & Snoop Dogg	Deep Cover	1991
Sly & The Family Stone	Sing a Simple Song	1968	KRS-One	Sound of Da Police	1993
The Mohawks	The Champ	1968	Onyx	Slam	1993
The Mohawks	The Champ	1968	De La Soul	Keepin' the Faith	1991
The Parliaments	Good Old Music	1968	Kurious	Walk Like a Duck	1992
Harry Nilsson	Rainmaker	1969	Danger Doom	Space Ho's	2005
Harry Nilsson	Rainmaker	1969	Cypress Hill	I Ain't Goin Out Like That	1993
Ike & Tina Turner	Cussin', Cryin' & Carryin' On	1969	House of Pain	Put Your Head Out	1992
The Winstons	Amen Brother (Sampled in 3135)	1969	N.W.A.	Straight Outta Compton	1998
The Winstons	Amen Brother	1969	Rob Base & DJ E-Z Rock	Keep it Goin Now	1988
The Winstons	Amen Brother	1969	Kid 'N Play	Bill's at the Door	1991
The Winstons	Amen Brother	1969	Run-DMC	Run's House	1988
Brethren	Outside Love	1970	A Tribe Called Quest	Electric Relaxation	1993
Lonnie Smith	Spinning Wheel	1970	Beastie Boys	Flute Loop	1994
Funkadelic	Good Old Music	1970	Common	Tricks up my sleeve	1992
James Brown	Funky Drummer (1513 sampled)	1970	Dr. Dre	Let Me Ride	1992
James Brown	Funky Drummer	1970	N.W.A.	F Tha Police	1988
James Brown	Funky Drummer	1970	Beastie Boys	Shadrach	1989
James Brown	Funky Drummer	1970	Public Enemy	Bring the Noise	1987
James Brown	Get Up, Get Into It…	1970	Nas	Where Are They Now	2006
Little Richard	The Rill Thing	1970	Eminem	I Remember	2000
Power of Zeus	The Sorcerer of Isis	1970	Sneaker Pimps	6 Underground	1996
The Magictones	Good Old Music	1970	Jungle Brothers	Jimbrowski	1987
5th Dimension	The Rainmaker	1971	Eminem	Crack a Bottle	2009
The Backyard Heavies	Expo '83	1971	Kanye West	Runaway	2010
Aretha Franklin	Rock Steady	1971	TD	Feelin' James	1987
James Brown	Blues and Pants	1971	The Notorious B.I.G.	Just Playing (Dreams)	1994
James Brown	Escape-Ism	1971	Beastie Boys	Get it Together	1994
James Brown	Soul Pride	1971	Kurtis Blow	Suckers in the Place	1988

Kool & The Gang	N.T.	1971	Snoop Dogg & Dr. Dre	Tha Next Episode	1993
Led Zeppelin	When the Levee Breaks (191 Samples)	1971	Beastie Boys	Rhymin & Stealin	1986
Led Zeppelin	When the Levee Breaks	1971	Enigma	Return to Innocence	1994
James Brown	Soul Power	1971	Pete Rock	They Reminisce Over You	1992
Bobby Byrd	Hot Pants	1972	Big Daddy Kane	Raw	1987
Jimmy Smith	Root Down (And Get It)	1972	Beastie Boys	Root Down	1994
James Brown	Talkin Loud & Sayin Nothin (1972)	1972	Run-DMC	Beats to the Rhyme	1987
James Brown	Get On The Good Foot	1972	De La Soul	Freedom Speak	1989
Lyn Collins	Think (About It)	1972	Rob Base & DJ E-Z Rock	It Takes Two	1988
Lyn Collins	Think (About It)	1972	Destiny's Child	Nuclear	2013
Michael Jackson	Ain't No Sunshine	1972	The Game	Heaven's Arms	2012
Michael Jackson	Ain't No Sunshine	1972	Portishead	Sour Times (Lot More) Remix	1994
Michael Jackson	Ain't No Sunshine	1972	Neneh Cherry	Somedays	1992
Mountain	Long Red (live)	1972	Jay-Z	99 Problems	2003
Mountain	Long Red (live)	1972	Kanye West	The Glory	2007
Rare Earth	I Just Want To Celebrate	1972	Beck	Derelict	1996
The Jimmy Castor Bunch	It's Just Begun	1972	Pharrell Williams	How Does It Feel?	2007
The Jimmy Castor Bunch	It's Just Begun	1972	Rob Base & DJ E-Z Rock	Check This Out	1988
The Whatnauts	Why Can't People Be Colors Too?	1972	A Tribe Called Quest	Oh My God	1993
Barry White	I'm Gonna Love Your Just a Little Bit More Baby	1973	Beastie Boys	Time to Get Ill	1986
Isaac Hayes	Joy	1973	DJ Magic Mike	Do You Like Bass	1991
James Brown	Mind Power	1973	E Da Boss	Go Left	2007
James Brown	Stone to the Bone	1973	Double J	The Hitman	1991
James Brown	Take Some, Leave Some	1973	Ice Cube	A Bird in the Hand	1991
James Brown	The Boss	1973	Nas	Get Down	2002
James Brown	The Payback	1973	Queen Latifah	If You Don't Know	1991
Lafayette Afro Rock Band	Hihache	1973	Biz Markie	Nobody Beats the Biz	1987
Lafayette Afro Rock Band	Hihache	1973	Flying Lotus	Vegas Collie	2007
Little Feat	Fool Yourself	1973	A Tribe Called Quest	Bonita Applebaum	1990
Little Feat	Fool Yourself	1973	Lupe Fiasco	Till I Get There	2011

Melvin Bliss	Synthetic Substitution	1973	Naughty by Nature	O.P.P.	1991
Melvin Bliss	Synthetic Substitution	1973	Ghostface Killah	Mighty Health	2000
Skull Snaps	It's a New Day	1973	The Pharcyde	Passin Me By	1992
Skull Snaps	It's a New Day	1973	The Prodigy	Poison	1994
The Honey Drippers	Impeach the President	1973	LL Cool J	Around the Way Girl	1990
The Incredible Bongo Band	Apache	1973	Sugarhill Gang	Apache	1981
The Incredible Bongo Band	Apache	1973	Logic	100 Miles and Running	2018
Blowfly	Sesame Street	1974	M-Beat	Style (sampled 2x faster)	1993
Blowfly	Sesame Street	1974	Roni Size	Phizical (sampled 2x faster)	1994
Commodores	The Assembly Line	1974	Public Enemy	Bring the Noise	1987
Isaac Hayes	Breakthrough	1974	LL Cool J	Breakthrough	1987
James Brown	Funky President	1974	De La Soul	Ghetto Thang	1989
James Brown	Papa Don't Take No Mess	1974	Mary J. Blige	You Don't Have to Worry	1993
The Soul Searchers	Ashley's Roachclip	1974	EMF	Unbelievable	1991
The Soul Searchers	Ashley's Roachclip	1974	P.M. Dawn	Set Adrift of Memory Bliss	1991
Southside Movement	I've Been Watching You	1975	Beastie Boys	So What'cha Want	1992
Aerosmith	Walk This Way	1975	De La Soul	Keepin' the Faith	1991
AWB	School boy Crush	1975	Erik B. & Rakim	Microphone Fiend	1988
Black Heat	Zimba Ku	1975	Jessie J	Price Tag	2001
Black Heat	Zimba Ku	1975	Chance the Rapper	14,400 Minutes	2011
Bob James	Take Me to the Mardis Gras	1975	Run-DMC	Peter Piper	1986
Graham Central Station	The Jam	1975	Beastie Boys	Body Movin	1998
Grover Washington	Hydra	1975	A Tribe Called Quest	Check the Rhime	1991
Tower of Power	Ebony Jam	1975	Beastie Boys	B-Boy Bouillabaisse	1989
James Brown	Get Up Offa That Thing	1976	Meato	Hey Fonzo	1988
Kid Dynamite	Uphill Peace of Mind	1976	Ice Cube	Rollin' Wit' the Lench Mob	1990
Kid Dynamite	Uphill Peace of Mind	1976	Public Enemy	Contract on the World Love Jam	1990
Thin Lizzy	Johnny the Fox Meets Jimmy the Weed	1976	Beastie Boys	Shake Your Rump	1989
The Isley Brothers	Footsteps in the Dark	1977	Ice Cube	It Was a Good Day	1992
Captain Sky	Super Sporm	1978	Mazzi	Dalmations	

Cerrone	Rocket in the Pocket (live)	1978	Beastie Boys	Paul Revere	1986
Herman Kelly	Dance to the Drummer's Beat	1978	Aqua Sky and The Raga Twins	Ready for This	2005
The Brothers Johnson	Ain't We Funkin' Now	1978	Roxanne Shanté	Bite This	1985
Manzel	Midnight Theme	1979	Cypress Hill	How I Could Just Kill a Man	1991
Vaughan Mason	Bounce, Rock, Skate, Roll	1979	Daft Punk	Da Funk	1995
Cerrone	Rocket in the Pocket (live)	1979	Deltron 3030	3030	2000
Billy Squire	The Big Beat	1980	Jay-Z	99 Problems	2003
Funkadelic	You'll Like It Too	1981	NWA	Straight Outta Compton	1988
Buddy Miles	Train	1986	Beastie Boys	Skills to Pay the Bills	1992

Appendix 2:

Pictures of Materials Applied to Drums and Cymbals:

Figure 28. BFSD Quesadilla

Figure 29. BFSD Original

Figure 30. BFSD HALOS

Figure 31. BFSD Steve's Donut

Figure 32. BFSD Donut XL

Figure 33. BFSD Snare-Bourine Donut

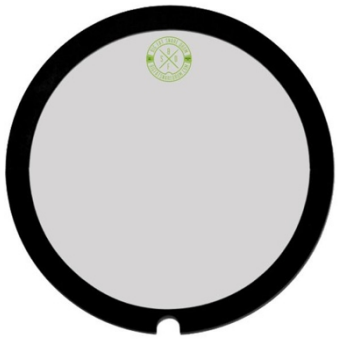

Figure 34. BFSD Big Green Monster

Figure 35. BFSD The Shining

Figure 36. BFSD Big Fat Necktie

Figure 37. Dream Cymbals Naughty Saucer

Figure 38. Dream Cymbals ReFX Crop Circle

Figure 39. Drumgees Accessory Strap

Figure 40. MoonGel Damper Pads

Figure 41. Cotton Handkerchief

Figure 42. LP Raw Sound Enhancer Snare

Appendix 3:

Questions asked of Interview Subjects:

Questions for Drummers:

1. What/who are your earliest funk influences?
2. How would you describe the evolution of funk from its earliest days? Who stands out in your mind as a major player/influencer on that scene?
3. Are there stages of funk's development that seem to stand out to you?
4. Do you have any thoughts on the way that clave has influenced funk?
5. Do remember a specific point/epiphany moment where the "feeling" or "pocket" of funk clicked for you?
6. At what point did hip-hop music (or did it ever) influence your playing?
7. Did/does any singular hip-hop artist/producer/drummer stand out to you?
8. How did you bridge the gap between what you knew about music & drumming and the hip-hop genre & hip-hop beats?
9. What aspect of hip-hop drumming/music/production resonated with you most? How did/does that influence your playing?
10. Early in your drumming development - did hip-hop drum production have any influence on the way you tuned your drums, the drums you chose to incorporate in your setup, or your cymbal selection?
11. If so, how did you tune/affect your drums and cymbals to emulate produced drum sounds?
12. Are you ever required to interpret drum loops or beats programmed in pre-production?
13. What was/is your process for interpreting programmed drumbeats/loops?
14. How do you manage situations where the programmed parts are more dense or complicated than a human can perform?
15. Has hip-hop music and/or drum programming, inspired you to develop new techniques and/or coordination?
16. What preparations to your instruments did you have to make in studio/live situations? Did/do you affect your drums with homemade or aftermarket products?
17. Do you have any thoughts on the overall influence of hip-hop on current drumming vocabulary and drum production?
18. Do you have any thoughts on the way DJs/beat makes may have influenced live drummers?
19. Do you have any thoughts on the way that the live drummer may have influenced the DJ or beatmaker?
20. Considering the current state of drumming (gospel chops, technique gods, minimalist beat gurus); why do you think live drumming isn't included in hip-hop more often?

21. Do you have any thoughts on the way drummers are currently affecting their kits with all manner of homemade or aftermarket devices? (Mutes, jingles, cymbals on drums, stacked cyms, upside-down snares, etc)
22. Do you have any predictions/thoughts about the current state of funk/hip-hop drumming and where it might be going?

Questions for DJs/Beatmakers:

1. Do you have any funk musical influences?
2. How would you describe the evolution of funk from its earliest days? Who stands out in your mind as a major player/influencer on that scene?
3. Are there eras in funk's development that seem to stand out to you?
4. What is your opinion on the connection of funk music, break beats, and hip-hop?
5. What are your thoughts on the way that live bands/drummers have influenced hip-hop/EDM beat production? Are live bands/drummers continuing to influence hip-hop/EDM music?
6. What inspired you to DJ - learn turntablism — or produce music?
7. Did you ever study a musical instrument? How did your musical studies influence your DJ performance style?
8. Did your musical influences/studies influence your sense of musical phrasing?
9. Do you ever consider music theory concepts when composing, mixing, or improvising?
10. How did you develop your rhythmic vocabulary for scratching?
11. Do have any favorite drummers or bands that have influenced your DJ rhythmic/scratching vocabulary?
12. Are there particular drums sounds (decades/production styles/drummers) that inspire or inform/influence you?
13. Have you ever worked as a DJ with a live drummer or band? What was that experience like – how do you balance the role of the DJ vs. the drummer? Do you know if the drummer had to alter their drum set to blend with your sounds?
14. How would you describe the relationship between drummers and DJs?
15. Do you produce beats? If so, what influences your rhythm programming? What influences the sounds you choose?
16. Do you see any influence of DJs or scratching in the drumming world?
17. Are you aware of any drummers that work to imitate DJs? Your thoughts/opinions?

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