# **Processing the Mix**

Popular Music's Sheet Music

Joran de Block 3292150

Name: Joran de Block Student number: 3292150 Master Thesis Musicology University Utrecht Docent: Prof. dr. E.G.J. Wennekes Date: 22 July 2015

## Preface

Near the end of the year 2014 I attended a course at Utrecht University which discussed the current affairs within musicology. Various items were discussed and many different fields of musicology were involved, but one specific branch within musicology sparked my interest more than the others: phonomusicology, the study of recordings.

For the course's term paper I decided to discuss what analysis of recordings of popular music are present and how these analyses were realised within musicology. The main argument presented in the paper was the absence of vital processes that contribute to the final product we, as listeners, listen to. Nonetheless the paper was a bit unsatisfactory for me because the course had a limit on the length of the term paper. Therefore I was not able, in my opinion, to fully demonstrate the shortcomings I believe exist in the presented theories and analysis for recordings. As a result, I am presenting this idea again. However this thesis contains a slight adjustment and I will be elaborating much more on the present discourse within musicology regarding recordings of popular music.

## **Table of Contents**

Preface	ii
Introduction	4
"The Mix"	6
Musicology's Take	9
Popular Music's Sheet Music	17
Musicology's Second Take: Methodologies to Analyse the Mix	21
Graphing the Mix: "Firework" and "I Just Had Sex (feat. Akon)"	29
Conclusion	36
Bibliography	37
Appendix	41
TT Dynamic Range Meter results	41
Katy Perry – Firework graphs	
Musical Balance	42
Performance Intensity Level	43
The Lonely Island – I Just Had Sex (feat. Akon) graphs	
Musical Balance	44
Performance Intensity Level	45

### Introduction

In today's day and age it is rare to find anyone, while travelling, who does not have an earplug in either one or both ears. These earplugs are either connected to a smartphone, an iPod, or any other portable device which has the ability to play music. Music has become portable and is available at any time and anywhere. Music is almost everywhere. All of this is possible due to the technological developments made throughout the last century. When people play this portable version of music, whatever form it resides in (i.e. CD, vinyl, mp3), they are listening to a recording of a musical event that has long since seized to exist.

What is therefore striking is that only in the last decade or so musicology has seemed to embrace the idea of studying recordings in-depth and musicologists are still trying to find methodologies to analyse these.<sup>1</sup> Phonomusicology, the study of recordings<sup>2</sup>, has spurred academics to do more research into recordings. The academic perspectives vary immensely. Some authors see the possibilities recordings give, while others do not and question the very nature of the recorded material. Many have contributed to the academic perspectives on the production of recordings. What is discussed most is the process of how these products we listen to today have been created for the listener to enjoy time and time again. However, not all aspects of the process have been discussed at length, particularly the mix and mixing process. It seems in musicology, and phonomusicology as well, that when the mixing process is touched upon by the authors it is usually an acknowledgement of how the mix and the mixing process are discussed within musicology.

In this thesis the academic perspectives on both will be discussed at length. By demonstrating these, the importance of the mix for the sound carrying product will be illustrated. Furthermore it will show why it is important to analyse the mix, and why the mix of popular music in particular is an essential part of the finished product. The main concern within the thesis lies with the recordings which are meant as consumable products and are created as such. The majority of these products are created in a stereo image, but there are sound carrying formats which transcend the two dimensional space to position the listener literally within the music. These latter formats will not be discussed since they are not representative for the most produced sound image in recordings. In addition to this the aesthetic debate on recording and mixing practices will concentrate on classical music and pop music production. What will be illustrated is that both reside at one end of the spectrum aesthetically which impacts the process of realising a finished product for the consumer to experience. This leads to the contradicting views on utilising the recording

<sup>1</sup> This conclusion can be reached by analysing the publishing dates of the literature I used for this thesis. The oldest source I use was published in 2000.

<sup>2</sup> Stephen Cottrell, "The Rise and Rise of Phonomusicology" in *Recorded Music: Performance, Culture and Technology*, ed. Amanda Bayley (Cambridge: Cambridge University Press, 2010), 15 – 16.

studio, therefore other genres are not included in the debate. Furthermore, a discussion is presented of the methodologies present about the mix of pop music. This discussion will focus mostly on the methodology of William Moylan as it is explained in his book *Understanding and Crafting the Mix: The Art of Recording.* Two case studies were chosen to clarify how a mix can be analysed in-depth regarding their musical balance and dynamic contour along with this methodology. Another feature that will be highlighted is the use of compression within the mix of pop music. Compression is used to reduce the difference between the peak volume and the lowest volume of the recording. Though noted by others before, it has always been mentioned in the context of assumptions. That is why I will argue it is possible to provide an academic perspective on the use of compression in the mix. Before the above can be realised, however, one question should be considered first: What is considered to be "the mix"?

## "The Mix"

Before the position of the mixing process within the field of musicology can be discussed, it is important to realise what this process is and what can be defined as "the mix". The clearest definition of the mix, and the process, can be found in the book *Zen and the Art of Mixing* by Eric Sarafin.<sup>3</sup> Even though Sarafin is an audio engineer and thus has not written from an academic perspective, he has been mixing since 1992 and can therefore provide a reliable and apt description of what can be characterised as the mix. He states: "A mix is the final 2-track (left and right) presentation of a production (which contains the performance of an arrangement of a song). [...] Once the recording process is complete, the production is ready for the mix. Our job is to take the many individual recorded parts, anywhere from two to 100 or more, and combine and order these parts to create a stereo track playable by the consumer."<sup>4</sup>

When looking at Sarafin's description of what the mix is, the process shimmers through. Its information has to be considered when trying to define what the mix is. Several authors within phonomusicology have been contributing to the notion as well. One of these authors is James Barret. He puts forth another definition of what can be taken into account concerning the mix. In his chapter "Producing Performance" in *Recorded Music: Performance, Culture and Technology* Barrett states that the mix is the culmination of processes where the "tracked" instruments are "mixed down to a stereo master."<sup>5</sup> Here "tracked" is used to refer to the recording of the instruments. Interestingly Barrett's definition is in essence the same as that Sarafin's, but a clear explanation of what happens during the "mix down" of all those tracks is missing.

In *Recorded Music* Barrett is not the only author who comments on the mix. Albin Zak does so as well. In his chapter "Painting the Sonic Canvas: Electronic Mediation as Musical Style" he refers to it as "shaping relationships among the sounds collected on recordings."<sup>6</sup> Zak does not mention this as a definition of the mix, but it can be interpreted as one. This assumption is emphasised in the light of the comments of Virgil Moorefield on the audio domain. Moorefield expresses that "shuffling the order of multiple layers of perception is uniquely suited to audio."<sup>7</sup> The mix, with the given definitions, is in essence a "shuffling of multiple layers" to create a final product to listen to.

<sup>3</sup> *Zen and the Art of Mixing* was published under his "Mixerman" pseudonym. Sarafín used this to write books without compromising his professional career. After the internet found out it was Sarafin, he embraced the name. On Mixerman's Facebook page and Mixerman's home page, the name of Sarafin is clearly present.

<sup>4</sup> Mixerman, Zen and the Art of Mixing (Milwaukee: Hal Leonard Books, 2010), 23.

<sup>5</sup> James Barrett, "Producing Performance" in *Recorded Music: Performance, Culture and Technology*, ed. Amanda Bayley (Cambridge: Cambridge University Press, 2010), 94.

<sup>6</sup> Albin Zak, "Painting the Sonic Canvas: Electronic Mediation as Musical Style" in *Recorded Music: Performance, Culture and Technology*, ed. Amanda Bayley (Cambridge: Cambridge University Press, 2010), 307.

<sup>7</sup> Virgil Moorefield, "Modes of Appropriation: Covers, Remixes and Mash-ups" in *Recorded Music: Performance, Culture and Technology*, ed. Amanda Bayley (Cambridge: Cambridge University Press, 2010), 297.

Weighing in on the discussion of what the mix is, Timothy Day contributes to what the process of mixing, or "mixing down", actually might encompass. In *A Century of Recorded Music* Day discusses the recording practices within the domain of classical music and how microphones can be used to accomplish the desired sound.

In the recording studio one microphone or a number of microphones might be used to catch the blend and balance that the musicians themselves, or their conductor, judged most satisfactory, or else the microphones used to adjust the balance, or to modify the balance in certain passages or just with certain instruments, to bring forward or give extra presence to a single, crucial stroke on the glockenspiel, for instance. Or close miking might be arranged to disregard or ignore the effect in the live acoustic, allowing the desired blend and balanced to be obtained by mixing tracks after the recording sessions.<sup>8</sup>

Day mentions what the multiple microphones are used for; blending and balancing the recorded sounds. This is done during the recording or "tracking" of the music and it has great influence on the mix and the mixing process. Considering the definitions provided by Sarafin, Barrett, Zak, and Moorefield, Day gives an insight of what happens during the mixing process; the multiple sound sources are balanced and blended to create the final product listeners can obtain.

Nevertheless, this only demonstrates one aspect of the extensive process that results in the mix. The full scope of what can be considered the mix and what the mixing process encompasses is found in the book *Understanding and Crafting the Mix: The Art of Recording* by William Moylan. On the mix he states the following:

Mixing is where [...] the individual sound sources that were recorded or synthesized are combined into a two-channel or a surround-sound recording that will become the final version...<sup>9</sup>

This correlates with the definitions that have already been discussed above. Moylan does not deviate from these. However, he does elaborate on this stating the mix is a combination of the separate tracks, recorded or realised through synthesis,<sup>10</sup> which creates "relationships between

- 9 William Moylan, Understanding and Crafting the Mix: The Art of Recording (Burlington: Focal Press, 2007), 319.
- 10 Moylan, Understanding the Mix, 320.

<sup>8</sup> Timothy Day, A Century of Recorded Music: Listening to Musical History (London: Yale University Press, 2000), 24.

individual sources or small groups of sources.<sup>11</sup> Where Moylan differs in his definition from Sarafin, Barrett, Zak, and Moorefield is the inclusion of what the mixing process can encompass.

The process [...] of shaping the mix is very similar to composing. Sounds are put together in particular ways to best suit the music. The mix is crafted through shaping the sound stage, through combining sound sources at certain dynamic levels, through structuring pitch density, and much more. How these many aspects come together provide the overall characteristics of the recording, as well as all its sonic details.<sup>12</sup>

As shown in this passage, the mixing process consists of all the post-production manipulations to the sound sources that are present, either recorded or realised through synthesis, to create the final product. The mix is the result of these manipulations.

The definitions provided by Sarafin, Barrett, Zak, and Moorefield are therefore falling short to explain what the mix is. It cannot be denied it is a product of shuffling multiple layers which shape relationships between the recorded sounds into a final stereo track presentation playable by the consumer, but this definition fails to include the entire process of how the sounds are being manipulated to create the mix. With the description of the mixing process by Moylan in mind, it is obvious the mix should be defined as follows: The mix is the final product of a process which manipulates the recorded sound sources in whichever way deemed necessary before it is realised into a stereo representation of the work. Therefore it is important to note that when the mix is discussed, the discussion is about a manipulated body of work.

<sup>11</sup> *Ibid.*, 322. 12 *Ibid.*, 319.

### **Musicology's Take**

When taking the definition of the mix as described in the previous section into account, it is paramount to examine what has been written about manipulation regarding recorded sounds within musicology. Authors might not have been aiming to give a definition of the mix or to discuss it consciously, but they may have provided insights about sound manipulation in general. This helps to contribute to a musicological understanding of the phenomenon. In the following section, the manipulation to recorded sound is the main concern.

Rick Altman discusses the recording process in his article "The Material Heterogeneity of Recorded Sound". He concentrates on the use of microphones within the recording process and how these alter the sound that is recorded.<sup>13</sup> Altman argues that manipulation is already present before any sound is picked up by a microphone. Due to specific placement of the microphone in relation to the sound source, a specific characteristic is stored in the track. In addition Altman discusses the manipulation in the microphone selection. Microphones are designed to pick up specific frequency ranges and, with choosing one, another form of manipulation is presented because selecting a microphone can enhance or neglect specific frequencies. Paul Théberge agrees with Altman concerning these manipulations. Microphones are where sound manipulation starts as they capture specific characteristics and these can be manipulated further when placed differently in relation to the sound source. As such, they are important manipulation tools.<sup>14</sup>

The introduction of the *Cambridge Companion to Recorded Music* by Nicholas Cook, Erik Clarke, Daniel Leech-Wilkinson, and John Rink presents another aspect of manipulation to recorded sound. The authors touch upon the editing aspect of recording, where perfect takes of a performance are selected and combined to create the perfect performance. With the arrival of multitrack recording and digital technology, the possibility to alter many aspects of the recording also arrived. It is argued that the performance is manipulated to come to a satisfactory performance.<sup>15</sup> Eric Clarke contributes a historic perspective on the editing of recordings. He attributes the ability to edit tracks to the possibilities created with new technology and the strength of the microphones.<sup>16</sup> This is something that is echoed by Théberge. The construction of the final performance in the final product, which differ from each other by the former being editing takes and the latter being manipulating the sound qualities of the performances, is connected to the

<sup>13</sup> Rick Altman, "The Material Heterogeneity of Recorded Sound" in *The Popular Music Studies Reader*, ed. Andrew Bennet et al. (New York: Routledge, 2006), 272 – 275.

<sup>14</sup> Paul Théberge, "'Plugged In': Technology and Popular Music," in *The Cambridge Companion to Pop and Rock*, ed. Simon Frith et al. (Cambridge: Cambridge University Press, 2001), 5-6.

<sup>15</sup> Nicholas Cook et al., "Introduction," in *The Cambridge Companion to Recorded Music*, ed. Nicholas Cook et al. (Cambridge: Cambridge University Press, 2009), 4.

<sup>16</sup> Eric Clarke, "The Impact of Recording on Listening," Twentieth-Century Music 4 (2007): 53 - 55, 58.

technological developments.<sup>17</sup> Andrew Blake demonstrates in "Recording Practices and the Role of the Producer" in the *Cambridge Companion to Recorded Music* how the editing of takes is considered to be necessary for realising the perfect performance in classical music and popular music. It is a recording which is a copy of an event that never precisely happened.<sup>18</sup> These constructed performances resonate with the simulacra-stadia posed by Jean Baudrillard. Steven Wurtzler has applied these to music recordings.<sup>19</sup> In short, he argues that the creation of a performance which never precisely happened can be categorised in the third stage of simulation: simulation proper. It is a copy of a sound event which has no original. It is a compilation of several events to construct the final product.

Besides this feature of manipulation, Blake continues to evaluate parts of the mixing process. He discusses the effects that have been added to tracks to create the final result.<sup>20</sup> The effects which Blake is referring to are for instance, equalisation (altering the frequency emphasis), reverberation (altering the acoustic space), and compression (altering the dynamics). Other effects, such as flanger, chorus, and phaser are used to alter the shape of the wave form of the recorded material. Théberge and Zak contribute to the manipulation of these effects as well. Théberge takes note of the dynamic compression in the drum sound of recordings,<sup>21</sup> while Zak gives a brief explanation of certain effects a sound engineer has at hand and what these do to the characteristics of the recorded sound. Furthermore, Zak emphasises the balancing of the tracks in relation to the entire production as a form of manipulation.<sup>22</sup> The effect which is discussed at length is the echo better known as the reverb effect. It is the creation of artificial acoustics to the recorded sound which leads to a synthetic space in which the sound event is situated.<sup>23</sup> Serge Lacasse calls these synthetic spaces "micro-acoustic worlds."<sup>24</sup> Zak elaborates on this. The creation of artificial reverb machines, which simulate the acoustic characteristics of different spaces, resulted in an unprecedented control over the placement within acoustic spaces of sound sources. What Zak points out is the paradoxical use of these new circumstances. Due to these technological advances a sound

<sup>17</sup> Théberge, "'Plugged In'," 8 - 9.

<sup>18</sup> Andrew Blake, "Recording Practices and the Role of the Producer" in *The Cambridge Companion to Recorded Music*, ed. Nicholas Cook et al. (Cambridge: Cambridge University Press, 2009), 42, 51.

<sup>19</sup> Philip Auslander, "Tryin' to Make it Real: Live Performance, Simulation, and the Discourse of Authenticity in Rock Culture," in *Liveness: Performance in a mediatized culture*, 2<sup>nd</sup> edition, (London: Routledge, 2008), 116.

<sup>20</sup> Ibid., 45, 47, 48.

<sup>21</sup> Théberge, "'Plugged In'," 11.

<sup>22</sup> Albin Zak, "Getting Sounds: The Art of Sound Engineering" in *The Cambridge Companion to Recorded Music*, ed. Nicholas Cook et al. (Cambridge: Cambridge University Press, 2009), 71 – 73.

<sup>23</sup> James Barrett, "Producing Performance" in *Recorded Music: Performance, Culture and Technology*, ed. Amanda Bayley (Cambridge: Cambridge University Press, 2010), 93.

<sup>24</sup> Serge Lacasse, "The Phonographic Voice: Paralinguistic Features and Phonographic Staging in Popular Music Singing" in *Recorded Music: Performance, Culture and Technology*, ed. Amanda Bayley (Cambridge: Cambridge University Press, 2010), 227.

source is able to inhabit two vastly different acoustic spaces at the same time.<sup>25</sup> The sonic landscape which is created by these effects has been accentuated by the use of headphones in combination with portable music playing devices, such as the Walkman, Discman, and more recently iPod.<sup>26</sup>

The micro-acoustic worlds do not only consist of manipulation within the alteration of acoustic space with reverb. Another important part of manipulating the synthetic space is the phonographic staging: The spatial separation and positioning of sound sources on the horizontal axis of the stereo image presented in recordings. Andrew Goodwin contributes to this form of sound manipulation. He attributes this equally to the technological advances made with the portable music players, such as the Walkman and car radios. Because of this technology, the listener became aware of the stereo image presented in the recordings since the image was now perceived up close. With the headphones of the Walkman, and the position of the speakers in the car, listeners were experiencing the music as if they were inside the phonographic stage.<sup>27</sup> The use of headphones is an argument which is repeated by Clarke in relation to the phonographic staging. The synthetic constructed stereo image conjures an image of a virtual music space which is primarily located in the listener's head.<sup>28</sup> An example for the use of phonographic staging in popular music is supplied by Théberge: The spatial separation of the drums.<sup>29</sup> For classical music, Barrett argues the phonographic staging of the instruments of an orchestra is modelled after the position the conductor has in relation to the orchestra.<sup>30</sup> The perspective from which the sound is perceived is important for the phonographic staging of sound sources. Barrett continues to elaborate on this from a historical perspective. From early on it was already common practice to stage the sound sources in relation to the microphone creating a balance in the musical phrases. This was all done from the perspective as if a listener was present.<sup>31</sup> Furthermore, it is argued that the phonographic staging is not necessarily from an audience position, rather a position where the listener is situated between the musicians who are performing the piece.<sup>32</sup>

All these manipulations contribute to the synthesis of an illusionary sound world where the listener perceives the recorded music. This is something clearly discussed by the authors who have been discussed above. What is interesting about the introduction of the *Cambridge Companion to Recorded Music* by Nicholas Cook, et al. is the argument about realism. It is presented that what we

<sup>25</sup> Zak, "Painting Sonic Canvas," 315.

<sup>26</sup> Ibid., 308.

<sup>27</sup> Andrew Goodwin, "Rationalization and Democratization in the New Technologies of Popular Music" in *The Popular Music Reader*, ed. Andrew Bennet et al. (New York: Routlegde, 2006), 276.

<sup>28</sup> Clarke, "Impact Recording Listening," 64 - 65.

<sup>29</sup> Théberge, "'Plugged In'," 14.

<sup>30</sup> Barrett, "Producing Performance," 96.

<sup>31</sup> Ibid., 90.

<sup>32</sup> Ibid., 100.

as listeners listen to is not a feature that ever existed at the same point in time, or one that took place in an acoustic space that exist in the physical world.<sup>33</sup> Altman states the final product is therefore always an interpretation and not an historic accurate document of a performance; it is a representation of a performance. He goes on to argue the performance is an illusionary one.<sup>34</sup> The representation of performance argument is present in multiple discussions. Barrett views recordings as representations of a performance due to the manipulation to the tracks.<sup>35</sup> Zak states that the "acoustic truth" has been distorted due to the manipulations that have been done to the recorded sounds.<sup>36</sup> Technology has an impact on this and therefore a faithful representation of the sonic event is never attainable.<sup>37</sup> The criticism portrayed is that no recording can truthfully represent a musical event and the performances are hidden from the listener, resulting in an illusion of a performance on a recording.<sup>38</sup> Clarke defines these performances as "acousmatic." There is no visual information available to the listener that correlates with the auditory information.<sup>39</sup> However, visual stimuli are not necessary to perceive a performance as Peter Johnson points out. It is a feature listeners are accustomed to from live performances, for example, the visual obscuration of the orchestra during an opera and organ lofts in churches. It does not render the musical performance ineffective.<sup>40</sup> Yet Simon Trezise expresses the notion of realism in a different manner in which he considers the mixing process.

> The record and associated equipment are telling us about a performance, but it is not the performance itself; it is filtered through a large number of processes and contexts with which the original performer has nothing to do.<sup>41</sup>

Acknowledging the impact of the mixing process on the final constructed performance and the effects present, poses the question of authority. Who is responsible for these alterations which result in the performance interpretations on the final mix? Several observations have been made and most point towards the engineers.

Théberge debates that the technological advances contributed to the complexity of the tasks

<sup>33</sup> Cook et al. "Introduction," 4.

<sup>34</sup> Altman, "Heterogeneity Recorded Sound," 275.

<sup>35</sup> Barrett, "Producing Performance," 100.

<sup>36</sup> Zak, "Painting Sonic Canvas," 310.

<sup>37</sup> Cottrell, "Rise of Phonomusicology," 19.

<sup>38</sup> Peter Johnson, "Illusions and Aura in the Classical Audio Recording," in *Recorded Music: Performance, Culture and Technology*, ed. Amanda Bayley (Cambridge: Cambridge University Press, 2010), 38.

<sup>39</sup> Clarke, "Impact Recording Listening," 49 - 50.

<sup>40</sup> Johnson, "Illusions Audio Recording," 40.

<sup>41</sup> Simon Trezise, "The Recorded Document: Interpretation and Discography" in *The Cambridge Companion to Recorded Music*, ed. Nicholas Cook et al. (Cambridge: Cambridge University Press, 2009), 207.

of the engineer. Therefore, mixing has become a specialised task.<sup>42</sup> Blake provides another insight. It is not uncommon for a producer to be responsible for making the product commercially viable.<sup>43</sup> This is a feature that can have an impact on the mix. It can colour the timbre of the work to make sure it is well reviewed by the consumer. Goodwin highlights the power of the producer, who can excerpt a lot of control on the final product. This does raise the question of authority over the final mix, whether or not it can only be attributed the engineer or the producer.<sup>44</sup> This feature is also touched upon by Cook, Clarke, Leech-Wilkinson, and Rink. They debate it is not merely composers who solely realise musical works anymore, but that producers and engineers contribute to the final product as well.<sup>45</sup> Zak argues the authorship lies within the domain of the aesthetic choices made by whoever is behind the mixing desk.<sup>46</sup> In the article "Sound Studies: New Technologies and Music" Trevor Pinch and Karin Bijsterveld do not question the authorship of the manipulations. They state it is the engineer who manipulates the sound: "Sound engineers, whether through miking, reverb, or mixing, are engaged in reconfiguring the sonic space of the studio."<sup>47</sup> This is echoed by Zak, who argues that the sound engineer, due to the specific knowledge required to operate the controls, has a central aesthetic place.<sup>48</sup> Allan Moore clearly voices the identity of who controls the manipulation:

No longer does performance exist in an arena where what is of principal importance is the identity of the performer. [...] Instead performance exists in an arena where the individual who has done most to shape the aural experience is the producer, with or without the input of the performer.<sup>49</sup>

The arguments presented on authority, manipulation, editing, effects, phonographic staging, and microphones are valuable to understand what the recordings go through before reaching the final product. However, Zak points out an important stance on the synthetic aspects of the recordings. Not all recordings aim to represent a version of sound conception which exists in the physical realm.<sup>50</sup> Zak states: "sonic realism is a slippery notion."<sup>51</sup>

50 Zak, "Art Sound Engineering," 63.

<sup>42</sup> Théberge, "'Plugged In'," 10.

<sup>43</sup> Ibid., 38.

<sup>44</sup> Goodwin, "Technologies Popular Music," 276.

<sup>45</sup> Cook et al., "Introduction," 7.

<sup>46</sup> Zak, "Art Sound Engineering," 63.

<sup>47</sup> Trevor Pinch and Karin Bijsterveld, "Sound Studies: New Technologies and Music," *Social Studies of Science* 34 (2004): 635, 641.

<sup>48</sup> Zak, "Art Sound Engineering," 68.

<sup>49</sup> Allan Moore, "The Track" in *Recorded Music: Performance, Culture and Technology*, ed. Amanda Bayley (Cambridge: Cambridge University Press, 2010), 263 – 264.

<sup>51</sup> Ibid., 64.

Commenters on recordings have declared that the medium is deceptive in relation to a pure representation of the acoustic image.<sup>52</sup> It relates to Zak's comment on sonic realism. Even so, what if a realistic representation of a musical event is not the aim of recordings? The medium might have started out in the beginning as the desire to create a "sound photograph"<sup>53</sup> and a form of storage for sound,<sup>54</sup> but, as shown by Altman and Théberge, the microphones used to capture the sounds are responding different to sound. These filter the perception to the sound recorded by omitting or emphasising different frequencies within the sound. Therefore, as Trezise states, recordings can never be considered to be a historical document that accurately represents a sound event.<sup>55</sup> So if sonic realism is unattainable, the question of what are we listening to arises.

As illustrated earlier, it is a performance which consists of multiple manipulations to create the final product that represents a perspective on a musical piece. What sound perspective we are listening to depends on the aesthetic choices of the production team. As Zak states, "Some renderings aspire to acoustic realism, others to fantasy, but whatever the case, the sound of a recording has much to do with the technical abilities and aesthetic choices of those whose hands control the signal path."<sup>56</sup> It depends on what the aim for the finished product is; acoustic realism, or an acoustical sound space which does not exist. These two contradictory practices seem to manifest within two quite different musical genres; classical music and popular music.

Many of the discussed authors debate what the recording aesthetics seem to be within classical and popular music. The practices within both are vastly different and the aesthetics seem to portray this as well. On the classical music aesthetics of recording Blake argues it is crucial to create the sonic equivalent of the "best seat in the house"<sup>57</sup> while trying to persuade a perspective of registering a sound event.<sup>58</sup> Johnson contributes by stating classical music uses the recording to represent the most naturalistic simulation of a live performance as if the listener of the recording is actually present at the time of the performance.<sup>59</sup> Therefore, it is argued by Clarke that within the classical spheres the studio is used in pursuit to record the most realistic impression of the sonic events taking place.<sup>60</sup> This pursuit of the most realistic impressions can be seen in the phonographic staging as well. As noted earlier, the orchestra's phonographic staging is set from the point of view of the conductor so the listener can experience the recording as if the orchestra was positioned right in front of them while being seated in the perfect position hearing every nuance.

<sup>52</sup> Johnson, "Illusions Audio Recording," 37.

<sup>53</sup> Day, Century Recorded Music, 33.

<sup>54</sup> Clarke, "Impact Recording Listening," 53.

<sup>55</sup> Cooke et al., "Introduction," 7.

<sup>56</sup> Zak, "Art Sound Engineering," 63.

<sup>57</sup> Blake, "Practices and Producers," 39.

<sup>58</sup> Ibid., 41.

<sup>59</sup> Johnson, "Illusions Audio Recording," 37 – 38.

<sup>60</sup> Clarke, "Impact Recording Listening," 53 – 54.

Even though a truthful representation is unattainable, the aesthetics present in classical music align with the view of Pierre Boulez, who stated that recordings should portray the most realistic version of the sound event to the best of the technologies capabilities.<sup>61</sup>

The contrast with the aesthetics regarding recordings in popular music could not be greater. Blake, Clarke, Johnson, and Zak all draw the same conclusion. A realistic representation of a sound event is not the intent of the mixes of popular music. Popular music's aesthetics in general contribute to this according to Zak:

In the popular sphere, aesthetic traditions are fluid, and always open to revision and updating. Experimentation is welcome and its success easily measured by market response. [...] In an atmosphere of sonic experimentation, engineers, musicians, producers and audiences came to appreciate the expressive qualities of electronically manipulated sound. [...] recordings assert their own versions of acoustic reality, and that a recording's sound-world is defined by its makers through a process of creative distortion of real-world musical events.<sup>62</sup>

Experimentation is the argument brought forth by the other authors. Popular music exploits the studio for its technological tools to construct new sonic experiences<sup>63</sup> and new acoustic images<sup>64</sup> until the result is satisfactory.<sup>65</sup> Zak argues the distortion of the sonic reality in pop music is seen as an expressive mode of music in the aesthetics.<sup>66</sup> This is realised within the mix.

Since mixing has become a separate operation from recording it permits more complex arrangements because the recorded material can be built upon.<sup>67</sup> The aesthetics for pop music allows this especially. Constructing synthetic worlds in which the work is set and experimenting with said world is the discourse within pop music.<sup>68</sup> According to Moore the discourse of experimentation is due to the fact that the engineers work by feel while trying to find something distinctive.<sup>69</sup> It is a feature that is discussed by Zak as well. The imaginary virtual creation underlines the ambition to create a unique sounding product, resulting in the pursuit of "sonic

<sup>61</sup> Day, Century Recorded Music, 55.

<sup>62</sup> Zak, "Painting Sonic Canvas," 307 – 308.

<sup>63</sup> Clarke, "Impact Recording Listening," 53 – 54.

<sup>64</sup> Johnson, "Illusions Audio Recording," 37.

<sup>65</sup> Blake, "Practices and Producers," 54.

<sup>66</sup> Zak, "Painting Sonic Canvas," 319.

<sup>67</sup> Barrett, "Producing Performance," 94.

<sup>68</sup> Ibid., 100.

<sup>69</sup> Moore, "The Track," 259.

distinctiveness" and "emotional authenticity" over high fidelity.<sup>70</sup>

The aesthetics regarding recording pop music shown above illustrates the aesthetics are far from capturing the sound event in its most realistic form. Therefore, analysing the mixes of pop music and classical music makes an interesting case study. The aesthetics of classical music attempt to embody sonic realism while presenting the illusion of a live performance. Popular music manipulates the recorded sounds until it is modelled into a satisfactory result for the responsible entities. As stated in the "Introduction" of the *Cambridge Companion to Recorded Music*, what was recorded became less relevant; what mattered is the end product.<sup>71</sup> To complicate the aesthetics further the end product also is dependent on the specific musical genre. This is put forth by Sarafin<sup>72</sup> and Moylan.<sup>73</sup> Both demonstrate that the mix is a result of which perspective is pursued in combination with in which style and genre the music is residing. For this reason I will be concentrating on popular music mixes.

<sup>70</sup> Zak, "Painting Sonic Canvas," 310-312.

<sup>71</sup> Cook et al. "Introduction," 4.

<sup>72</sup> Mixerman, Zen Art Mixing, 20, 28 – 31.

<sup>73</sup> Moylan, Understanding the Mix, 327.

## **Popular Music's Sheet Music**

Considering the arguments within musicology about the mix and the definition given earlier on the mix and its process, it is not surprising Adam Krims describes that music in general can always be defined as "designed sound."<sup>74</sup> The "designed" aspect is only emphasised more by the manipulations done to the recorded or synthetic sounds during the mixing process. As discussed, there are many different manipulations that can be attributed to the sound events. It encompasses the balancing of volume, placement on the phonographic stage, creating acoustic realities with reverb, altering the wave form, and emphasising certain frequencies of a specific sound event to create the mix which is listened to. Taken this into account, it is vital to understand that these possibilities of manipulating exist when analysing music; particularly when it is analysed with recordings. Therefore it is ever more striking that the academic perspectives within musicology do not discuss the mix or mixing process directly.

The commentary regards manipulation as a part of the recording process. It may not have been the initial aim of the authors, but a few have been defining parts of what can be considered the mix, however, as shown above there is hardly anyone analysing it. When a recording is analysed it is about what the listener hears. It is seen as the presentation of a performance in a stereo image, so it is remarkable that the authors barely mention the mix in a descriptive manner and hardly contribute any form of analysis on the phenomenon. For example, Altman acknowledges the mixing process by stating the stored sounds can be tampered with, but any further analysis or definition is missing.<sup>75</sup> This is not the only case where the mix, or its process, is acknowledged without any further analysis. Théberge mentions the mix and its process. He attributes the notions of spatial separation – including effects to manipulate the phonographic staging – to the mixing process, but an adequate description is not given.<sup>76</sup> Blake,<sup>77</sup> Goodwin,<sup>78</sup> Clarke,<sup>79</sup> Johnson,<sup>80</sup> and Cook, et al.<sup>81</sup> indicate that manipulations to sound can be constructed within the mix. Contrary to these authors, Zak does acknowledge the mix is shaping the sound of the musical work,<sup>82</sup> however a fundamental analysis or a description of the phenomenon is absent as is with the rest of them. Moore shows there have been attempts of analysing the mix.<sup>83</sup> Using the views by David Schwarz and Zak on the effects added to the sounds within the recordings, he shows what has been done to

<sup>74</sup> Adam Krims, "The Changing Functions of Music Recordings and Listening Practices," in *Recorded Music: Performance, Culture and Technology*, ed. Amanda Bayley (Cambridge: Cambridge University Press, 2010), 70.

<sup>75</sup> Altman, "Heterogeneity Recorded Sound," 272.

<sup>76</sup> Théberge, "'Plugged In," 3, 6, 10.

<sup>77</sup> Blake, "Practices and Producers," 45 – 48.

<sup>78</sup> Goodwin, "Technologies Popular Music," 276, 279.

<sup>79</sup> Clarke, "Impact Recording Listening," 55.

<sup>80</sup> Johnson, "Illusions Audio Recording," 39.

<sup>81</sup> Cook et al. "Introduction," 4.

<sup>82</sup> Zak, "Art Sound Engineering," 71 - 72.

<sup>83</sup> Moore, "The Track," 261, 263.

the sound events. It is illustrated that Schwarz tries to attribute meaning to effects given to certain passages while Zak merely analyses which effects are in play. Another author who tries to analyse the mix is Serge Lacasse. Centred around the vocal properties within recordings, he evaluates the phonographic staging of the voice in popular music.<sup>8485</sup> Even though Moore and Lacasse contribute to the analysis of recordings and its exploitation of effects, they do not analyse the mix. With all these approaches within musicology, it begs the question why the mix is not analysed.

All authors discussed here acknowledge there are manipulations during the creation of the mix, but never stress the importance. As has been shown over the course of this thesis, the mix is a vital aspect to recordings. However, how can it be that such an essential factor has been overlooked – especially by musicology – until now? This is an assessment that has been made before. It is an assessment that has been stated before. Day questions why the recordings have been neglected by scholars and historians, particularly since they are seen as a crucial part in the development of music in the last century.<sup>86</sup> For this there is an explanation.

It closely relates to the aesthetics of musicology itself. In short it comes down to the following problem. Musicology mostly concentrates on sheet music,<sup>87</sup> or the scores, because a recording portrays an individual interpretation of the work which has been written down in staff notation. Therefore it is not advisable to analyse a recording. The interpretation distorts the musical elements of the work and how it was intended to be performed by the composer and is therefore not objective. To give meaning to a musical piece, the score, or provisional sketches, are far more valuable than a recording of the work. Stephen Cottrell argues this fascination with sheet music of musicology resides in "the traditional reliance on the concept of the work as being meaningful in itself" and this meaning is present "within the score on which performances of the work are based."<sup>88</sup> It is something Day points out as well.<sup>89</sup> Nevertheless, this is only one of the problematic aspects of the relationship between musicology and recordings.

Another facet of the negligence regarding the analysis of recordings is pointed out by Cook. Besides the focus on the score, the means of analysing recordings were limited. However, the technological developments over the last few decades have contributed in the creation of academic analysis models to apply to recordings and gather objective readings from them. Cook explains the

<sup>84</sup> Serge Lacasse, "The Phonographic Voice: Paralinguistic Features and Phonographic Staging in Popular Music Singing" in *Recorded Music: Performance, Culture and Technology*, ed. Amanda Bayley (Cambridge: Cambridge University Press, 2010), 225 – 251.

<sup>85</sup> Serge Lacasse, "Persona, Emotions and Technology: The Phonographic Staging of the Popular Music Voice" paper presented at the Centre for the History of Analysis of Recorded Music symposium 2, London, 17 – 18 September 2005, 2.

<sup>86</sup> Day, Century Recorded Music, 228.

<sup>87</sup> Amanda Bayley, "Multiple Takes: Using Recordings to Document Creative Process" in *Recorded Music: Performance, Culture and Technology*, ed. Amanda Bayley (Cambridge: Cambridge University Press, 2010), 206.

<sup>88</sup> Cottrell, "Rise of Phonomusicology," 29.

<sup>89</sup> Day, Century Recorded Music, 228-229.

use of recordings is validated since it is now possible to use them the same way as written sources.<sup>90</sup>

Cottrell demonstrates further complications in this affair: The notation of music. Notation is usually realised in the accepted staff notation which most of the Western scholars are familiar with, however the problem with this form of notation is the incapability to capture all elements which are present within a recording. Since it is the sheet music that is analysed Cottrell argues that musicology has primarily become a study of music as literature.<sup>91</sup> The ineffective form of notation is not only argued by Cottrell. Staff notation has the disadvantage of solely concentrating on one aspect of the music; Moylan, and Cook both emphasise this. The traditional score notation is selective and emphasises the pitch relations within the musical work,<sup>92</sup> but lacks the capability to give specific information about, for instance, dynamics and dynamic nuances.<sup>93</sup>

This does not mean that notating the sound events is an avenue that should not be explored. Even though visual stimuli are not necessary to experience the recorded performance, visual information is fundamental when analysing. Cook continues to explain after his critique on staff notation that visual information, in any form of notation or graphical representations can be an effective tool to be able to hear various details which otherwise could go unnoticed.<sup>94</sup> Furthermore, it adds to the understanding to the sound space.<sup>95</sup>

It is an aspect to which recordings contribute as well. Amanda Bayley is one of the authors who advocate the use of recordings to further the understanding of the sound space. She paraphrases philosopher Lee Brown who states that recordings do not distort, but attribute to a further understanding and appreciation of the music because the recorded performance can be repeated over and over again. As a result of this, details which otherwise would be missed in a live setting are revealed to the listener.<sup>96</sup> The unlimited access to the performance is the advantage a recording has over a live setting of the work. This is argued by Clarke as well. When attending a concert, the music takes place in time and is impossible to repeat exactly in the same way. To hear a specific nuance again precisely how it was performed is impossible. There is nothing that can be done about this.<sup>97</sup> With a recording it is possible to pause and rewind to the particular moment within the performance and experience it once again. This advantage of recordings is emphasised by Day. The ability to investigate a musical performance in detail creates the possibility to analyse

<sup>90</sup> Nicolas Cook, "Methods for Analysing Recordings" in *The Cambridge Companion to Recorded Music*, ed. Nicholas Cook et al. (Cambridge: Cambridge University Press, 2009), 221.

<sup>91</sup> Cottrell, "Rise of Phonomusicology," 23 – 24.

<sup>92</sup> Moylan, Understanding the Mix, 102.

<sup>93</sup> Cook, "Methods Analysing Recordings," 226.

<sup>94</sup> Ibid., 223.

<sup>95</sup> Moylan, Understanding the Mix, 102.

<sup>96</sup> Bayley, "Multiple Takes Process," 207.

<sup>97</sup> Clarke, "Impact Recording Listening," 49.

recordings in-depth.98

However, the use of recordings remains problematic within the musicological discourse, since it is viewed as an interpretation of the work. It is something that occurs after the music has been composed.<sup>99</sup> However, as Cook and Day have pointed out, recordings played a significant part in music's development throughout the last century.<sup>100</sup> Especially considering what has been argued earlier on about the aesthetics of the mix between classical and pop music. The creation of a distinctive micro-acoustic world for pop music is a feature which makes analysing the mix of these an interesting feature. Day compares this to a new form of composing.

Even with the comparatively primitive techniques of the 1960s, popular music was evolving different kinds of music and different kinds of musical creation, with the performers working with a producer, using the recording studio and sixteen-track tape recorder to piece together little bits of music, and single lines of sound, in ways not unlike the composer wrestling with a work's constituent parts, with tiny fragments of his music as he struggles to build up structures on manuscript paper.<sup>101</sup>

It is not a comparison drawn by Day alone. Moylan relates the creation of the mix to a modern form of arranging and the orchestrating of the materials.<sup>102</sup> This all contributes to the notion put forth by Zak. Pop music does not reside within a scripted version of the musical elements, but rather exists in the recording itself. Therefore pop recordings are the musical works.<sup>103</sup> Clarke agrees with Zak that a recording is not merely a captured performance, but also a musical work.<sup>104</sup>

If it is accepted that pop music exploits recordings as the composition rather than an interpretation, it is ever clearer the mix should be analysed. Regardless of the manipulations done to the sound events, the final product is the representation of how the work should be portrayed to the listeners. Since pop music does not strive to create an image as close as possible to acoustic realism and the mix is the composition, it is paramount to have a methodology to analyse the mix. It is an unattainable goal to map out all manipulations during the creation of the composition, but, when accepting that the mix of pop music is on par with a score of a classical work, it has to be analysed.

<sup>98</sup> Day, Century Recorded Music, 216.

<sup>99</sup> Cook et al., "Introduction," 1.

<sup>100</sup> *Ibid*.

<sup>101</sup> Day, Century Recorded Music, 126.

<sup>102</sup> Moylan, Understanding the Mix, 328.

<sup>103</sup> Zak, "Painting Sonic Canvas," 319.

<sup>104</sup> Clarke, "Impact Recording Listening," 51.

### Musicology's Second Take: Methodologies to Analyse the Mix

There are several authors who have attempted to analyse the mix, but most analyses have been about recordings in general and how to unravel these. As illustrated earlier it revolves around pointing out what manipulations have been done to the sounds. It is necessary to inspect these manipulations. However it does not contribute to the mix analysis in general. This closely correlates to what Cottrell, Cook, and Moylan have shown, that notating the sounds within the recorded material is problematic. The most employed form is staff notation. This, however, limits the notation of the recorded material on several levels. It concentrates on pitch relations within the music while disregarding other aspects which impact the representation of the song. Cottrell notes that within phonomusicology several modified versions of staff notation have been investigated, but even these visualisations have become increasingly inadequate to notate the sound events in recordings.<sup>105</sup> It is a feature Cook does not underestimate. He shows how the change from a scorebased form of analysis to a recording based analysis complicates the notation. Furthermore he declares that nothing of the performance is off limits in a new form of notation.<sup>106</sup> Moylan clarifies why staff notation is ill-equipped to analyse the mix with. He states, "[The] emphasis[ on] pitch relationships in musical context [...] comprises a very small part of our concerns about sound in audio."<sup>107</sup> So if staff notation is considered to be inadequate to visualise the recorded performance, what other tools of analysis are there?

In "Methods for Analysing Recordings" Cook highlights a few new methodologies to analyse recordings.<sup>108</sup> These vary in purpose and are generally designed to be used for classical music recordings. Even so, it does illuminate the possibilities to create meaningful methodologies for musicology to explore. One specific method Cook shows is one that has been adopted by for instance Lacasse: the spectrogram.<sup>109</sup> A spectrogram is a graphical print of a recording on which time (horizontal axis), frequency (vertical axis), and intensity (shading/colouring of the prominent frequencies) of a song are captured. There are advantages to this form of notation, however, as Cook notes himself, the disadvantage of using a spectrogram is the clarity of the data presented.<sup>110</sup> The lack of clarity is especially visible in the intensity and frequency part of such a graph. It takes all frequencies present in the analysed recording. Due to the collective analysis, the frequencies of different sections will be grouped together if they are in the same frequency range which, in turn, influences the intensity shown. Therefore the intensity shown in the spectrogram does not represent one specific section, but rather the intensity of combined sections. What is important to understand

<sup>105</sup> Cottrell, "Rise of Phonomusicology," 24.

<sup>106</sup> Cook, "Methods Analysing Recordings," 223.

<sup>107</sup> Moylan, "Understanding the Mix," 102.

<sup>108</sup> Cook, "Methods Analysing Recordings," 224 – 225, 227, 229 – 232, 235, 237, 239 – 241.

<sup>109</sup> Lacasse, "Phonographic Voice Singing," 232, 235, 238.

<sup>110</sup> Cook, "Methods Analysing Recordings," 226, 228.

about the spectrogram is that the frequencies are related to pitch and not, as will be illustrated later, to timbre. In the three dimensional space of the spectrogram vital information regarding the mix is omitted. Therefore, it is not suited to analyse the mix.

However, as Cottrell indicates, the close study of recordings requires transcription to "facilitate detailed analysis or to disseminate the results of such analysis, or both."<sup>111</sup> The methodology to evaluate the mix is not present within the musicological discourse. However Lacasse has addressed a methodology which is capable to do so. In the paper "Persona, Emotions and Technology: The Phonographic Staging of the Popular Music Voice" he discusses parts of the methodology proposed by Moylan.<sup>112</sup> Despite the partial use of the methodology of Moylan by Lacasse's it contains valuable information to analyse the mix. It consists of techniques to create an easy to read graph for a wide audience regarding the mix.<sup>113</sup> These graphs are a result of close listening to recordings. Close listening functions to indicate the individual sound events/objects within the mix and in combination with graphing it contributes to the understanding of the mix.<sup>114</sup> Furthermore the methodology allows for comparison between mixes and therefore meaningful observations about the presented final product can be made.<sup>115</sup>

For these graphs to be easy to read for any audience, the clarity in representing the sounds of the mix is crucial. Following Moylan's methodology, Moylan explains how these graphs should be written down. The graph is a two dimensional representation of the mix.<sup>116</sup> Time is positioned on the horizontal axis and can be assigned in either seconds/minutes or in bars.<sup>117</sup> For accuracy bars will be used in this thesis. It is a form of musical diction that is far more accurate than seconds to analyse a musical work. The data on the vertical axis differs depending on which part of Moylan's methodology is used to evaluate the mix.<sup>118</sup> In the two dimensional chart the sound sources will be presented as coloured lines with a key to annotate which line is which. The different colours make it easy to distinguish between the sounds. Moylan stresses all instruments must be noted down by close listening to the recording.<sup>119</sup> However, instead of close listening to identify all sources it can also be done by reading the liner notes of an album. The liner notes contain the names and functions of the personnel working on the album which can give an insight which instruments were recorded for it. Perhaps not all were used in the analysed song, but determining whether a sound from the liner notes is present or not is easier than solely focusing on what is heard

117 Ibid., 107.

<sup>111</sup> Cottrell, "Rise of Phonomusicology," 24.

<sup>112</sup> Lacasse, "Phonographic Staging Voice," 1 – 11.

<sup>113</sup> Moylan, Understanding the Mix, 100 – 254.

<sup>114</sup> Ibid., 103, 100.

<sup>115</sup> Ibid., 102, 104.

<sup>116</sup> Ibid., 105.

<sup>118</sup> Ibid., 100 – 254.

<sup>119</sup> Ibid., 111 – 112.

and what it might be. Even though some sounds might not be written down in these notes, it is a good starting point to analyse the recording. The liner notes of the two case studies I will be using unfortunately do not have much information in them about this. Furthermore, Moylan states that some sounds may be grouped because it is not always desirable to write down every sound on a separate line. This obscures the clarity of the graph.<sup>120</sup> Moylan does not provide an example for this, but it is imaginable if this method was employed for an entire orchestra in a mix of pop music. To have a line for every single sound would result in a colourful mess that allows little to no overview. In my opinion it depends on the composition and which elements seem important to it. A critical aspect of this methodology is balancing the horizontal axis. Ample data can be written down in great detail, however the limitation of space must be considered when writing it down. Moylan states the graph has the greatest benefit if the data can be observed in its totality while maintaining enough detail so it can be analysed for the qualities of the material.<sup>121</sup>

The information put on the vertical graph depends on the analysed element of the mix. Moylan divides the mix into four dimensions; pitch, dynamics, sound quality, and spatial properties.<sup>122</sup> With pitch Moylan does not imply staff notation, but rather the frequencies manipulated to create a certain timbre of the recorded sound. The sound quality dimension is aimed at determining whether certain sounds are on pitch and their spectral properties. Spatial properties regard the phonographic staging of the mix, while the dynamic dimension is centred around the musical balance and performance intensity. These dimensions have also been noted by Moore,<sup>123</sup> Zak,<sup>124</sup> and Sarafin.<sup>125</sup> Yet, none of the authors incorporate these into a model to analyse the mix of pop music.

Some of the dimensions have already been discussed within musicology. As illustrated before the spatial properties of phonographic staging have been discussed by Goodwin, Theberge, Barrett, Zak, and Lacasse.<sup>126</sup> It is the framework in space in which the composition is presented and, as argued by Moore, the positions of the sections hardly ever change during the duration of the work.<sup>127</sup> The spectral qualities of sound are part of Moylan's methodology which he defines as the sound quality analysis. Though it contains data, it has little relevance to musicology and it can be described by the standard vocabulary. For instance, a sound event without a pitch can be described as a non-melodic component of the music. This part of Moylan's methodology relates closely to the pitch dimension. As has been shown a spectrogram could be used, however, this might not be as

123 Moore, "The Track," 258.

<sup>120</sup> Ibid., 109.

<sup>121</sup> Ibid., 107, 109.

<sup>122</sup> Ibid., 101.

<sup>124</sup> Ibid.

<sup>125</sup> Mixerman, Zen Art Mixing, 92.

<sup>126</sup> Lacasse, "Phonographic Staging Voice," 2.

<sup>127</sup> Moore, "The Track," 258 – 259.

clear. What Moylan tries to illustrate is the density of frequencies which are used for individual sound sources. Though a spectrogram can be useful, a spectrometer can show the entire pitch density in real-time and stills thereof can be made. This is something I have used in my bachelor thesis to analyse the spectral properties of certain elements within contemporary pop songs.<sup>128</sup> Furthermore, Moore argues that the same is applicable to the frequency density over the course of the song as the phonographic staging. It is part of the framework in which the composition is situated. However, Moore also indicates that the spectral image over the course of a composition might change by "strands dropping in and out."<sup>129</sup> Moylan mentions this aspect as well. He says this is used to emphasise climatic points within the work.<sup>130</sup> What is not discussed by these authors is the conclusion I have reached in the aforementioned bachelor thesis, namely that this spectral manipulation is a form of simulating dynamics since dynamics are problematic within

The complication of dynamics rests within the development of the increase of the average volume in the works. This is also known as the "loudness war." I explained what this term implicates in my bachelor thesis and Greg Milner illustrates this as well.<sup>132</sup> In short, the loudness war is the process of raising the average volume in the recording and compressing the dynamic range to create the loudest possible work and was initiated in the 1960s. As a result most contemporary pop songs have a dynamic range of 7 decibel (dB) or less. The aim nowadays is to create a record that is as close as possible to the 0 point of the decibel Full Scale (dBFS) where the lowest average level is almost as high as the highest peak. The dBFS is a scale that is measured in negative numbers where the 0 point is the absolute maximum of a signal which the digital equipment can process.<sup>133</sup> Milner argues that this practice has had a negative effect on recordings, since dynamics, which are important to a composition to create "a thrilling musical experience", are sacrificed for the sake of loud. The result of this is the density of the mix and as Moore says that "the gaps are, so to speak, filled in."<sup>134</sup>

Moylan does not discuss the loudness war in his methodology. Yet, he does not underestimate the importance of dynamics in music. The characteristics he attributes to dynamics illustrates the significance of analysing it despite the compression of the dynamic range in contemporary pop music. As Milner argues, Moylan indicates dynamics are responsible for the

<sup>128</sup> Joran de Block, "Van Fortissimo tot Fortissimo Possibile: Dynamiek in de Hedendaagse Popmuziek" (Bachelor thesis University Utrecht, 2012).

<sup>129</sup> Moore, "The Track," 258 – 259.

<sup>130</sup> Moylan, Understanding the Mix, 327.

<sup>131</sup> De Block, "Fortissimo Fortissimo Possibile," 30 – 31.

<sup>132</sup> Greg Milner, *Perfecting Sound Forever: An Aural History of Recorded Music* (New York: Faber and Faber, Inc., 2009), 248 – 249.

<sup>133</sup> De Block, "Fortissimo Fortissimo Possibile," 6 – 10.

<sup>134</sup> Moore, "The Track," 264.

nuances of musical ideas to push the composition forward and the expressive qualities and direction thereof.<sup>135</sup> Furthermore he adds that engineers have gotten precise control over the dynamics within the mix so that they can place certain material at a more prominent location if it is deemed necessary. The positioning of this is not done by sheer loudness. Moylan, although not arguing the density of the dynamics, assigns prominence of the material to the balancing of the frequencies of the sounds.<sup>136</sup> In staff notation the loudness of certain aspects is written down from pianissimo possibile to fortissimo possibile, but this is a vocabulary for dynamics in relation to the interpretation of the performer and does not provide the information of the loudness of the recording.<sup>137</sup> Therefore, a more accurate manner of analysing dynamics for recorded music should be implemented, Moylan argues. The dimension of dynamics can account for this. It can show – despite the dynamic density – how the mix is built up in relation to the arranging the sections of the music dynamically.

The solution to realise the accuracy Moylan aims to achieve for analysing dynamics is located in the reference dynamic level (RDL).<sup>138</sup> It is a value that is noted on the vertical axis of the graph to indicate the average dynamic level for the composition which is analysed and the sound events present within the recording are mapped onto the graph in relation to the RDL. This is done to create a graph which illustrates the balancing of sections within the mix. To determine the RDL Moylan states the following:

The RDL is a precise level that can be clearly defined. It is not subjective. All listeners putting forth the effort to perceive it will arrive at the same level. [...] The dynamic level is envisioned as a dimension of the essence of the piece of music. [...] A magic formula does not exist for determining the RDL. This is one of the significant artistic dimensions of a piece of music that defies theoretical analysis and instead uses the sensibilities of the listener. This does not make it subjective, only that it cannot be predicted by measured calculation, but is determined through the experience of the music and arrived at through an understanding of the piece.<sup>139</sup>

What Moylan tries to convey here is that the RDL is impossible to calculate and depends on the perception of the listener to create an objective value to analyse an entire mix from. It is quite an

<sup>135</sup> Moylan, Understanding the Mix, 138.

<sup>136</sup> Ibid., 139.

<sup>137</sup> Ibid.

<sup>138</sup> Ibid., 138, 140, 144, 145.

<sup>139</sup> Ibid., 144 - 145.

assumption to argue that every listener will come to the same conclusion. It is a matter of interpretation, which by default is always subjective. The use of a RDL is necessary for the methodology. However the claim made by Moylan that there is no actual formula to calculate this is incorrect. The average volume can be calculated with the help of a dynamic range meter. It gives an absolute objective value on the dBFS on the average dynamic range, including the peak and the lowest point within the recorded material. To create the graph for musical balance the RDL is an important part of the methodology. If it is possible to circumvent perception in producing the RDL it should be incorporated into the steps to create the graph.

After establishing the RDL, the sounds within the mix are written down in relation to that. In the graph Moylan reverts back to the terminology used in sheet music to indicate the dynamics of the sound sources and the RDL. However, he attributes the terminology to the intensity/energy of the composition.<sup>140</sup> When a sound source is perceived below the threshold of the RDL, the sound is regarded as withholding energy or withdrawn. A source which is observed above the RDL pushes the work forward. This contributes to the portrayal of the musical balance and building of the mix while also creating a graph from which meaningful observations can be made between different recordings and their constructed acoustic realities. The RDL can be calculated in an absolute figure, but this calculation does not apply to the individual sound sources. A way to determine the exact levels for these has yet to be constructed. As Moylan points out, the dynamics of the individual sections are established in relation to the RDL by close listening. Due to this being the analyst's perspective it is a subjective conclusion. For the overall RDL the objective measuring tool that is available is the dBFS. It is ranges from -96 dB to  $0 \text{ dB}^{141}$  and it is an unattainable goal to determine the exact level on the dBFS for individual sound sources. However, the dBFS can be used to indicate the average level of the mix. The RDL calculated by the dynamic range meter realises this, since the dBFS is transferable to the terminology incorporated by Moylan. Considering the range from pianissimo possibile to fortissimo possibile is divided into eight categories, the dBFS has to be divided into the same categories to correlate with the terminology. This is shown in table 1. This range is applied to the graph to illustrate the dynamic contour of the musical balance.

<sup>140</sup> Ibid., 142.

<sup>141</sup> Milner, Perfecting Sound Forever, 250.

Dynamics	dBFS range
ppp	-96 dB84dB
pp	-84 dB72dB
р	-72 dB60dB
тр	-60 dB48dB
mf	-48 dB32dB
f	-32 dB24dB
ff	-24 dB – -12dB
fff	-12 dB0dB

Table 1

This table shows the dynamic range of the contemporary pop music which, as stated before, is -7 dB to -0dB, is located within the *fff* range of the methodology illuminating the dynamic density. It also illustrates the problematic relationship with dynamics of pop music mixes crafted in the loudness war.

Moylan argues that dynamic levels do not exist as a specific level of loudness, but are rather understood in ranges and areas which depend on the comparison with another sound source or RDL.<sup>142</sup> These relationships are crafted in the mix. The control over musical balance in it also affects the performance of the events balanced. As a result of the balancing, the actual sound level of the recording does not correlate with the position in the created sound space.<sup>143</sup> It is a feature that has been acknowledged by Theberge,<sup>144</sup> Zak,<sup>145</sup> Blake,<sup>146</sup> and Lacasse.<sup>147</sup> Moylan refers to actual level as the performance intensity level.<sup>148</sup>

Performance intensity is the dynamic level at which the sound source was performing when it was recorded. In many music productions, this dynamic level will be altered in the mixing process of the recording. The performance intensity of the sound source and the actual dynamic level of the sound source in the recording will most often not be identical and will send conflicting information to the listener. [...] The dynamic levels of the various sound sources of a recording will often be at relationships that

- 145 Zak, "Art Sound Engineering," 69, 73.
- 146 Blake, "Practices and Producers," 45 48.

<sup>142</sup> Moylan, Understanding the Mix, 142 – 143.

<sup>143</sup> Ibid., 138.

<sup>144</sup> Théberge, "'Plugged In," 14.

<sup>147</sup> Lacasse, "Phonographic Voice Singing," 227.

<sup>148</sup> Moylan, Understanding the Mix, 151.

By graphing the performance intensity level (PIL) it is possible to depict how compression is applied to sound events to craft a dynamic range which is compromised. The graph to illustrate this uses the same vertical as horizontal elements as the musical balance graph, however it is paramount to understand these are two separate graphs. For the PIL graph the range from ppp - fff is positioned on the vertical axis.

The example of the voice has been used by Lacasse as well. The articles by Lacasse focus solely on the position of the singing voice in contemporary pop. He argues that the vocals are the most important feature of the compositions<sup>150</sup> since "the song characters [...] live through the singer's voices[.]"<sup>151</sup> Moylan states that essential sections of the composition are influential on which position they are assigned within the musical balance.<sup>152</sup> It provides an interesting feature to analyse with the methodology of Moylan. Is the voice actually the most important element within a mix of contemporary pop music? This is what will be analysed and discussed within the case studies presented in the next section.

<sup>149</sup> Ibid.

<sup>150</sup> Lacasse, "Phonographic Voice Singing," 226.

<sup>151</sup> Lacasse, "Phonographic Staging Voice," 1.

<sup>152</sup> Moylan, Understanding the Mix, 140 – 141.

## Graphing the Mix: "Firework" and "I Just Had Sex (feat. Akon)"

Moylan's methodology regarding musical balance and PIL is useful to incorporate within musicology. It can supply important information about how much compression has been applied to sound sources and the significance of the sound sources in relation to the dynamic levels within the mix which, in turn, provides a graph representing the build-up of a mix. From this a meaningful analysis can be made regarding mixing techniques and genre specific characteristics. To illustrate this, these two components of Moylan's methodology will be applied on two contemporary pop songs; "Firework" from Katy Perry, and "I Just Had Sex (feat. Akon)" by The Lonely Island.

Both case studies were implemented in my bachelor thesis.<sup>153</sup> Before I used them to argue the lack of dynamics in the songs while attributing which aspects were utilised to mimic a dynamic tension within the composition. However, both case studies have properties which make them a valuable source to re-visit for further analysis. First and foremost, both are incredibly popular songs judged by their respected views on their YouTube channels.<sup>154</sup> Besides their popularity, the dynamic range of the case studies is limited and both traverse the 0 value on the dBFS. It shows the problematic relationship with dynamics and illustrates that both are influenced by the loudness war. The melodic components have been analysed in my bachelor thesis which is why the following analyses solely concentrate on the build-up of the components present within the mix and the use of compression by applying the discussed methodology. This will be realised with special attention to the vocals. Lacasse states these are the most important musical sound within contemporary pop and the voice has been used as an example on multiple occasions to illustrate the use of compression. The analyses will concentrate on these features. As illustrated in previous sections, effects which manipulate the properties of the sound events and their eventual meaning have been discussed by Zak, Moore, and Schwarz. Therefore, the following analyses will focus on mapping the musical balance and PILs. These are presented by graphs in the appendix as figures 1 and 2 of the two case studies discussed later on.

The graphs were created by close listening to the works. For the musical balance graph, which depicts the build-up of the mix, a dynamic range meter was applied for additional information. The dynamic range meter is a measuring tool which calculates the average dynamic range on the dBFS of the work and produces the results in the form of a text document. This was used to calculate the RDL for both case studies.<sup>155</sup> The dBFS is shown on the y-axis of the graph including the RDL at its calculated position illustrated by a grey interrupted line, while the x-axis

<sup>153</sup> De Block, "Fortissimo Fortissimo Possibile," 15 – 19, 21 – 25.

<sup>154</sup> Katy Perry's official "Firework" video has 579,937,618 views on her YouTube channel, while the official "I Just Had Sex" video has 232,435,512 views on their channel as of June 7 2015. Both were uploaded in 2010, which means on average "Firework" is viewed 115,987,523 times per year, and "I Just Had Sex" is viewed 46,487,102 times per year.

<sup>155</sup> The results of the dynamic range meter can be found in the appendix figure 1.

shows the bars including a tempo notated in beats per minute (bpm). Furthermore, the y-axis has two categories noted as a reference point to Moylan's methodology. These are merely used to illustrate the dynamic range which the methodology originally uses. The x-axis also contains a division of the sections present in the work allocated at the appropriate bars. A key is supplied in the top right corner including the colours used for the different events in the music. Some colours are used at the same time at different levels in the graph. When this is the case, it is to illustrate there is more than one of the selected sound sources which is treated differently in the mix in relation to the placement and melodic contour. A grey line at the 0 value is also presented to highlight the limitation of the dBFS. Since the dBFS values of the different sound events in the mix are impossible to calculate exactly, the musical balance graphs should be seen as interpretations of the sound level in relation to the dBFS. It does however give an insight on how the mix is balanced.

When graphing the PILs of the sound events an RDL is not incorporated. It is not relevant to the average dynamic level at which the sounds were recorded or synthesised. Therefore, the y-axis portrays the dynamic range from pianissimo possibile (*ppp*) to fortissimo possibile (*fff*). The reason to revert to these dynamic properties lies within the performance as it was recorded. By using close listening to the performances, the degree of compression used in the mix on certain sound sources, such as the voice, can be exposed. For this it is important to determine the intensity in the performance in relation with the musical balance. What is needed for this is basic knowledge of the performing techniques and the dynamics of the instruments analysed. It supplies an understanding on how the sounds were originally recorded to create the specific tone heard in the composition. In short, it is an interpretation on the dynamics and how they are performed, as is the case in staff notation. The information contained on the x-axis is the same as the musical balance graph. A key will also be provided in the same fashion as discussed before, including the multiple use of a specific colour to indicate the presence of the same sound source.

#### Firework

Analysing "Firework" by Katy Perry, produced by StarGate, the first step was to find liner notes on the single to see the sounds present in the song. Unfortunately, the liner notes contain the following on the instruments: "Instruments - Mikkel S. Eriksen, Tor Erik Hermansen, Sandy Vee."<sup>156</sup> Therefore close listening was exclusively used to determine the sound sources present. The RDL was calculated by the TT Dynamic Range Meter at 7dB. Translating this to the dBFS, the RDL is at -7dB. Even though the peaks are over the 0 value on the scale, as argued before, there is no sound possible beyond it. What it does demonstrate is the dynamic density of the composition.

<sup>156</sup> Katy Perry, Firework (Capitol Records, 2010), liner notes.

The musical balance graph<sup>157</sup> highlights the use of perceived dynamics in the mix, while at the same time showing the lack of dynamics as well. Perry's vocals can be seen to be at the same dynamic level for most of the song, with the exception of the bride from bar 85 - 89. The harmonisations of the vocal melody can be seen in the second chorus beneath the RDL. In the following bridge the harmonies crescendo to be perceived above it. The harmonies on the words "ah" and "boom" appear again in the final chorus from bar 109 – 115 and are balanced over the main vocal line Perry sings. Furthermore, the dynamics used in the build-up to the chorus are clearly visible. The crescendo in the violins, the frequency glissandi, and the snare drum/hand claps, show how the climaxes are emphasised by this. However, the notion Lacasse argues - that the vocals are the most prominent within contemporary pop music – does not apply to the mix of "Firework." As demonstrated by the black line, the kick drum fulfils the most prominent role within the composition. The increase in volume and density in the sound during the chorus supplies it with more presence. The four-to-the-floor beat which is used for the composition is emphasised by the balancing of the kick drum far above the RDL. Another feature visible in the graph is the balancing of frequencies for dynamics. Throughout my bachelor thesis I have argued this is the case. This graph shows exactly when and which frequencies are emphasised to create a denser composition including the simulation of the dynamics. This PIL graph emphasises this as well.

When comparing the PIL graph with the musical balance graph it highlights the compression and synthesis of dynamics in the composition. The vocals of Perry range from mf - ff in the PIL graph, but this information is contradicting when compared to the musical balance graph. The only explanation for this discrepancy is the use of dynamic compression on the vocals. This is not the only example which depicts this. The bass guitar is constantly performed at a high intensity (fff), yet in the musical balance graph the bass guitar is perceived below the RDL during most of the song. During the ending phrase of the second and final chorus the bass carries an important melodic theme. To emphasise this it crosses the RDL. The most evident simulation of dynamics is present in the violin section of the work. In the mix the two violin sections alternate; one in the middle to low register, the other in the upper register. The first section plays staccato at a medium intensity. The second section is playing at *fff* the entire phrase, however as illustrated in the musical balance graph, these start far below the RDL in bars 33, 65, and 97. The crescendos are not realised by natural playing but are simulated by manipulating the volume of the phrase. The same can be argued for the snare drum. Through compression it appears as if the snare drum remains on the same level constantly, while the graph shows that there are far more nuances present in the intensity. These nuances occur in the same bars as the simulated dynamics of the violins.

<sup>157</sup> The musical balance and performance intensity level graph of Katy Perry's "Firework" are included in the appendix as graph 1.1 (musical balance) and 1.2 (performance intensity level).

The mix for "Firework" has been built to create synthesised crescendos, while the intensity of the vocals has also been synthesised due to compression to keep these at the same volume level within the composition. What can be deducted for "Firework" is that the vocals do indeed have a salient role in the mix, but the beat is far more present over the vocals. The accentuation of the pulse, usually provided by the snare drum, does not have much prominence, resulting in a far more concentrated composition around the beat. This is especially so in the chorus.

#### I Just Had Sex (feat Akon)

The Lonely Island's album *Turtleneck & Chain* does not contain credits of what instruments have been used to create the songs. It only contains the producers who have contributed to the songs.<sup>158</sup> Therefore the instrumentation of "I Just Had Sex" was compiled by close listening. The RDL was calculated by the TT Dynamic Range Meter at 5dB, which results in a -5dB on the dBFS in the musical balance graph. The peak of the work touches the 0 value on the left channel, but crosses it on the right. As argued with "Firework," the exceeding values of it do not influence the position of the RDL to -5dB.

The prominence of the vocals within the mix is highlighted by the musical balance graph.<sup>159</sup> Akon, who serves as the melodic counterpart to the alternating rapped verses of Andy Samberg and Jorma Taccome, has multiple vocal roles within the composition. Therefore his vocals are positioned ambiguously in the mix. In the choruses and the bridge Akon's melodic singing is above the RDL, while in the verses when he highlights certain passages of the mix his voice is below the RDL. Furthermore, in the chorus Akon harmonises certain phrases which are situated beneath the threshold of the RDL as well. Samberg and Taccome are situated above the threshold constantly. In the musical balance graph the use of dynamics is less featured. Dynamics are present in the low and high register synthesisers. However, these are much more prominent in the frequency glissandi throughout the composition. These are frequently employed to emphasise climatic points within the composition which can be seen in bars 4, 12, 24, 37, 40, 44, 48, 56, and 58. Further dynamics can be observed within the high register synthesizer. Due to the prominent low frequencies of the kick drum and the low register synthesizer it is only present during a few melodic phrases in the mix. These are mainly in the choruses and right before the half bar rests in the verses. Yet the kick drum has another prominent position. The beat is emphasised in the mix, while the pulse is also emphasised by the position above the RDL of the snare drum and the hand claps.

In the PIL graph there are further indicators for the use of compression. Akon's emphasised

<sup>158 &</sup>quot;Lonely Island, The - Turtleneck & Chain (CD, Album) at Discogs," Discogs, accessed June 7, 2015.

<sup>159</sup> The musical balance and performance intensity level graph of The Lonely Island's "I Just Had Sex" are included in the appendix as graph 2.1 (musical balance) and 2.2 (performance intensity level).

phrases in the verses are performed in the *ff* range, yet these are positioned beneath the RDL line. The intensity of the performance shows how the mix positions the emphasised phrases as background vocals while the chorus is performed at the same intensity level. Certain phrases of the chorus, such as the one in bar 11, 46, and 52, are performed in the *mp* range. However these are located above all other sound events. This illustrates how the balancing alters the dynamic properties of the performances. This is not necessarily evidence for the use of compression. The proof lies within the vocals of Samberg and Taccome. Their PILs during the verses are situated in the *mf* part of the graph, but in the final chorus when they are performing in the *ff* range, these phrases are at the same level in the mix. Besides, Samberg's and Taccome's vocal positioning is close to Akon's within the mix. Another example of compression can be found in the hi-hat. In the musical balance graph it is present during the choruses and parts of the verse. At the end of the first verse it is played closed alternating with opening up. This results in a PIL that peaks into the *ff* part of the graph, but in the mix it is at a consistent level.

What can be deducted from these graphs is that the dynamics present in "I Just Had Sex" are as in "Firework", synthetically created. The beat alternates with the vocals for prominence in the work. Additionally the conclusion can be drawn that the melodic contour of the song is balanced further from the RDL in comparison with the vocals and drums. This can be attributed to the lyrical significance of the composition, since The Lonely Island is a hip-hop comedy troupe. Furthermore, the compression is visible in the vocals from Akon, the hi-hat, and the choir at the final chorus and outro of the song. The mix favours the drums and vocals compared to the melodic content presented. This might also be because of the repetitiveness of the chords on which the song is written.<sup>160</sup>

#### Synthesizer PILs

So far there has been one problematic issue that has not been discussed: the PILs for the synthesizers in both compositions. The PILs of these are difficult to determine since the sounds created by these are designed and do not have an acoustic counterpart. Therefore the interpretation of the PIL in the graphs is rather crude. These synthesisers are probably programmed with the use of MIDI, which can be altered after the recording in exact placement, intensity, duration, and pitch after the recording. It might not even be recorded. It might just be programmed. As argued, for determining the acoustical recorded performances it is necessary to have knowledge of the performance techniques and how the tone of the instrument reacts to the various intensities of playing. If, for instance, the string section in "Firework" was not recorded with actual instruments but a software rendition of these, it still simulates the acoustical instrument. Therefore, it is possible

160 De Block, "Fortissimo Fortissimo Possibile," 22.

to determine its PIL without creating a problematic analysis.

The case studies illustrate the use of compression in the mix of contemporary pop music, especially in relation to the voice. Lacasse's notion of the importance of the voice can be seen as partially correct. It plays a significant role within the music and in the mix. However, as these case studies show, the beat has been given at least equal priority regarding the composition. What can be concluded from this is not necessarily applicable to all pop music mixes, but it is a methodology which can highlight how a mix has been balanced to create an overview of which sections are given more prominence over another.

#### **Moylan's Pitfalls**

Moylan's methodology regarding dynamics is a useful tool for musicology to create an apt depiction of the sound events present in a mix of pop music. It features an easy to read graph on balancing the sound events and can illustrate if compression is applied. However, it does have its flaws. The results in the graphs are presented by close listening, but liner notes can be used as aid if available. Even so, close listening is a form of analysis which is presented from a perspective and therefore it is a subjective analysis. Due to this subjectivity, other conclusions might be drawn and position certain components of the composition at a different place in the musical balance graph or perceive the PILs differently, thus resulting in a contrast between analyses on the use of compression. Moylan, however, neglects this part in his methodology.

In his exposition of the methodology used for these case studies, Moylan stresses that the results must be gathered objectively and that the information about the mix presented in the graphs is unbiased and accurate.<sup>161</sup> There is no room for subjectivity. Yet, the very nature of close listening is analysing from a perspective, making it biased in essence. Due to Moylan venturing into this area, a discrepancy within the methodology itself has been created. First he claims that independent results will be gathered to form the graphs, but then continues to state that the dynamic levels presented therein are analysed in relation to each other, furthermore mentioning that the specific levels thereof cannot be attained since these need to be put in context to the loudness portrayed in the composition.<sup>162</sup> And that is not the only inconsistency within the explanation. One of the very features of the methodology is close listening – almost the epitome of subjectivity – and this, in turn, leads to concentrating on one specific element within the music. This distorts the listening experience as a whole. Even though Moylan agrees with this, he sees it as something insignificant and states it is nothing to worry about: "It may distort the listener's perception of the material, and

<sup>161</sup> Moylan, Understanding the Mix, 100, 103, 106.

<sup>162</sup> Ibid., 139, 143.

the reference may be unstable, as the listener's attention will rightly be focused elsewhere."<sup>163</sup> All in all, his speaking of objectivity is brought to naught. If someone directs their attention to one specific component it becomes centralised in the listening experience and distorts the perception as whole. Moylan even emphasises that, so to say only unbiased results will be gathered from the graphs created with his methodology is untrue. The graph is a product of objective and subjective factors. This is paramount to realise when employing this methodology. Nevertheless, it does have its merits when considering analysing mixes of pop music.

### Conclusion

Over the course of this thesis a definition of the mix and the process involved in realising the final product for the listeners has been provided. While discussing the musicological debate on recordings, it became clear there is a lack of definitions for and analysing the mix in an academic context, but over the past decades several authors have been discussing it. Even though this was accomplished by only emphasising parts, it was a start. It is crucial vitally important to understand that the mix is the end game for commercially released music. Especially in the case of pop music.

Considering pop music is heavily reliant on recorded music as a representation of the work, the mix is in essence on par with sheet music from classical pieces. Therefore, when discussing pop music, it should be analysed. For this Moylan's methodology was used on two case studies. By applying this methodology it is possible to portray how a mix is built up despite pop's difficult relationship with dynamics. The dynamic density changed due to the loudness war has not improved the ability to identify the components presented in the musical work within the synthesised acoustic worlds, but with the mix' graphs a mix can be dissected effortlessly to attribute importance to sections within the compositions. Compared to a spectrogram, it is an improvement on reading sound events, even if it is created from a perspective.

For further research into the mixing practices of pop music the dynamic component of Moylan's methodology, including the alterations proposed in this thesis, is a valuable instrument to provide information on several aesthetics which are discussed within cultural studies. As Sarafin explains, the mix is a result of which perspective is pursued in combination with in which style and genre the music is residing. It is a feature Moylan mentions as well in relation to certain pitch qualities per genre. Assuming this is the case, the methodology provided here is an interesting course to explore. Within cultural studies, multiple claims have been made about what important elements in different musical genres are, such as rock music or hip-hop. Combining such cultural analyses and those of mixes by different artists or production teams, insights in how the authors of the mixes themselves see the portrayal of genre in relation to these discussions might be provided. The methodology can highlight aspects of the mix and illuminate which sound sources are deemed more important than others.

The omission of the mix and its process in the academic discourse of musicological debate on recorded music is odd considering its definition and the importance. Its notation is problematic and analysis on manipulation effects to music are few. The proposed methodology in this thesis can contribute to a better understanding of the creation of dynamics in pop music's dynamic dense constructed acoustic worlds. It is impossible to unravel the complete manipulation process of creating the final work we are presented with as listeners. However there is an opportunity to show how it is presented to us.

## **Bibliography**

- Altman, Rick. "The Material Heterogeneity of Recorded Sound." In *The Popular Music Studies Reader*, edited by Andrew Bennet, Barry Shank, and Jason Toynbee, 269 275. New York: Routledge, 2006.
- Auslander, Philip. "Tryin' to Make it Real: Live Performance, Simulation, and the Discourse of Authenticity in Rock Culture." In *Liveness: Performance in a mediatized culture*, 2<sup>nd</sup> ed., 73 – 127. London; New York: Routledge, 2008.
- Barrett, James. "Producing Performance." In *Recorded Music: Performance, Culture and Technology*, edited by Amanda Bayley, 89 – 106. Cambridge: Cambridge University Press, 2010.
- Bayley, Amanda. "Multiple Takes: Using Recordings to Document Creative Process." In *Recorded Music: Performance, Culture and Technology*, edited by Amanda Bayley, 206 224. Cambridge: Cambridge University Press, 2010.
- Blake, Andrew. "Recording Practices and the Role of the Producer." In *The Cambridge Companion Recorded Music*, edited by Nicholas Cook, Eric Clarke, Daniel Leech-Wilkinson, and John Rink, 46 53. Cambridge: Cambridge University Press, 2009.
- Block, Joran de. "Van Fortissimo tot Fortissimo Possibile: Dynamiek in de Hedendaagse Popmuziek." Bachelor Thesis, University Utrecht, 2012.

Clarke, Eric. "The Impact of Recording on Listening." Twentieth-Century Music 4 (2007): 47 - 70.

- Cook, Nicholas. "Methods for Analysing Recordings" In *The Cambridge Companion to Recorded Music*, edited by Nicholas Cook, Eric Clarke, Daniel Leech-Wilkinson, and John Rink, 221 245. Cambridge: Cambridge University Press, 2009.
- Cook, Nicholas and Eric Clarke, Daniel Leech-Wilkinson, John Rink. "Introduction." In *The Cambridge Companion to Recorded Music*, edited by Nicholas Cook, Eric Clarke, Daniel Leech-Wilkinson, and John Rink, 1 – 9. Cambridge: Cambridge University Press, 2009.

- Cottrell, Stephen. "The Rise and Rise of Phonomusicology." In *Recorded Music: Performance, Culture and Technology*, edited by Amanda Bayley, 15 – 36. Cambridge: Cambridge University Press, 2010.
- Day, Timothy. A Century of Recorded Music: Listening to Musical History. London: Yale University Press, 2000.
- Discogs. "Lonely Island, The Turtleneck & Chain (CD, Album) at Discogs." Accessed June 7, 2015. <u>http://www.discogs.com/Lonely-Island-Turtleneck-Chain/release/2878834</u>
- Goodwin, Andrew. "Rationalization and Democratization in the New Technologies of Popular Music." In *The Popular Music Studies Reader*, edited by Andrew Bennet, Barry Shank, and Jason Toynbee, 276 – 282. New York: Routledge, 2006.
- Johnson, Peter. "Illusion and Aura in the Classical Audio Recording." In *Recorded Music: Performance, Culture and Technology*, edited by Amanda Bayley, 37 – 51. Cambridge: Cambridge University Press, 2010.
- Krims, Adam. "The Changing Functions of Music Recordings and Listening Practices." In *Recorded Music: Performance, Culture and Technology*, edited by Amanda Bayley, 68 – 86.
  Cambridge: Cambridge University Press, 2010.
- Lacasse, Serge. "Persona, Emotions and Technology: The Phonographic Staging of the Popular Music Voice." Paper presented at the Centre for the History of Analysis of Recorded Music symposium 2, London, 17 – 18 September 2005. <u>http://charm.cchcdn.net/redist/pdf/s2Lacasse.pdf</u>. Accessed October 26, 2014.
- Lacasse, Serge. "The Phonographic Voice: Paralinguistic Features and Phonographic Staging in Popular Music Singing." In *Recorded Music: Performance, Culture and Technology*, edited by Amanda Bayley, 225 – 251. Cambridge: Cambridge University Press, 2010.
- Lonely Island, The. "I Just Had Sex (feat. Akon)," YouTube video, 2:55, posted by "thelonelyisland" December 18, 2010. <u>https://www.youtube.com/watch?v=lQlIhraqL7o</u> (Accessed June 7, 2015)

- Lonely Island, The. *I Just Had Sex*. Universal Republic, Konvict, digital download. Originally released January 8, 2010.
- Milner, Greg. *Perfecting Sound Forever: An Aural History of Recorded Music*. New York: Faber and Faber, Inc., 2009.

Mixerman. Zen and the Art of Mixing. Milwaukee: Hal Leonard Books, 2010.

- Mixerman Productions Facebook page, accessed September 25, 2014, <u>https://www.facebook.com/MixermanProductions/info</u>.
- Mixerman/Eric Sarafin. "Eric Sarafin Discography." Accessed May 14, 2015, http://mixerman.net/discography/
- Moore, Allan. "The Track." In *Recorded Music: Performance, Culture and Technology*, edited by Amanda Bayley, 252 268. Cambridge: Cambridge University Press, 2010.
- Moorefield, Virgil. "Modes of Appropriation: Covers, Remixes and Mash-ups in Contemporary Popular Music." In *Recorded Music: Performance, Culture and Technology*, edited by Amanda Bayley, 291 – 306. Cambridge: Cambridge University Press, 2010.
- Moylan, William. *Understanding and Creating the Mix: The Art of Recording*. Burlington: Focal Press, 2007.
- Perry, Katy. "Firework," YouTube video, 3:53, posted by "KatyPerryVEVO," October 28, 2010. <u>https://www.youtube.com/watch?v=QGJuMBdaqIw</u> (Accessed June 7, 2015)
- Perry, Katy. *Firework*. Capitol Records, CD single/digital download. Originally released October 26, 2010.
- Pinch, Trevor and Karin Bijsterveld. "Sound Studies: New Technologies and Music." *Social Studies of Science* 34 (2004): 635 648.
- Théberge, Paul. "Plugged In': Technology and Popular Music." In *The Cambridge Companion to Pop and Rock*, edited by Simon Frith, Will Straw, and John Street, 1 25. Cambridge: Cambridge University Press, 2001.

- Tresize, Simon. "The Recorded Document: Interpertation and Discography." In *The Cambdrige Companion Recorded Music*, edited by Nicholas Cook, Eric Clarke, Daniel Leech-Wilkinson, and John Rink, 186 209. Cambridge: Cambridge University Press, 2009.
- TT Dynamic Range Meter. Pleasurize Music Foundation, 19 March 2009. <u>http://www.kvraudio.com/product/tt\_dynamic\_range\_meter\_by\_pleasurize\_music\_foundation/news</u> (Accessed June 7, 2015)
- Zak, Albin. "Getting Sounds: The Art of Sound Engineering." In *The Cambridge Companion to Recorded Music*, edited by Nicholas Cook, Eric Clarke, Daniel Leech-Wilkinson, and John Rink, 63 – 76. Cambridge: Cambridge University Press, 2009.
- Zak, Albin. "Painting the Sonic Canvas: Electronic Mediation as Musical Style." In *Recorded Music: Performance, Culture and Technology*, edited by Amanda Bayley, 307 324. Cambridge: Cambridge University Press, 2010.

## Appendix

## Figure 1 TT Dynamic Range Meter results:<sup>164</sup>

<sup>164</sup> The results are created by loading the mp3-files into the TT Dynamic Range meter and it calculates the songs dynamic range.







