Ministry of Education and Science of Ukraine
Taras Shevchenko National University of Kyiv
Educational and Scientific Institute of Philology
Department of English Philology and Intercultural Communication

Master's thesis

ENGLISH SOUND ASSIMILATION IN SINGING: A CASE STUDY OF NORTH AMERICAN AND BRITISH SINGERS

Zhenzherukha Andrii

2nd year student of the Education Program

'English Communication Studies and Translation

and Two Western European Languages'

Field of science: 03 "Humanities"

Specialty: 035 "Philology"

Supervised by:

PhD **Karaban Anna**

«Допущено до захисту»

Протокол засідання кафедри англійської філології

та міжкультурної комунікації

Протокол № 8 від 18.04.2023

Зав. кафедри _____д. філол. н., проф. Алла БЄЛОВА

KYIV– 2023

CONTENTS

.

INTRODUCTION

Intelligibility is a key element to successful communication of ideas between any interlocutors but even more so between singers and their audience. Nevertheless, being subject to requirements of both language and music, they might sacrifice intelligibility to convey an artistic, emotional side of their lyrics. But which exact purposes encourage them to prioritize pronunciation of one sound over another? What benefit may they extract from this change of pronunciation? And most importantly, do they utilize changes that are not reflected in the common speech?

These are the main questions this research aims to start answering by considering cases and patterns of assimilation in performances of four towering modern singers – Adele, Ed Sheeran, Lana del Rey and The Weeknd. With outreach of tens of millions and growing, the way these artists use language may shape some listener's speech even more than dedicated English classes. Therefore, the **relevance** of this research is to study the phonetic perspective of these musician's use of oral language considering the adjustments commanded by signing.

The research on the topics bordering linguistics and singing is scarce. That is why the works devoted to assimilation in speech and changes in singing laid the foundation for this study. The studies on singing-related changes by Tiara Annisa, Wouter Jansen, Radoslav Pavlík and others played a crucial role to determination of the procedure of the study.

The **aim** is to test whether assimilatory patterns in singing are different from the ones in speech.

The **tasks** of the study are the following:

1) to analyze instances of assimilation in performances of AmE and BrE singers;

2) to compare the recognized assimilatory patterns of the singers across accents;
3) to assume reasons for the recognized assimilatory patterns;
4) to separate the assimilatory patterns not found in speech.

The **object** of the study is pronunciation of the English language in singing. The **subjects** are North American and British singers.

The methodology of phonetic research of speech is taken as an example and modified according to the needs of this specific study. The **methods** and **tools** applied are qualitative data analysis (spectrogram analyses), method of observation and PRAAT.

The study consists of three chapters.

Chapter 1 provides a theoretical framework for this research outlining the terms and classifications, such as classification of assimilation patterns and previous research on assimilation, crucial for the further analysis of data.

Chapter 2 explains the procedures for selecting and processing the studied material and delves into the methodology of spectrogram analysis.

Chapter 3 presents the results of the analysis as well as compares assimilatory patterns across accents, while also suggesting probable explanations for them.

CHAPTER 1. PHONETICS AND PHONOLOGY OF ASSIMILATION

1.1. Interdisciplinarity of the subject matter

The first chapter of this study comprehensively describes the research of assimilatory patterns and the role and capacities of phonology in sound analysis. It reviews theoretical approaches, measurement software, and categories of assimilation. Additionally, it outlines previous researches on assimilation in speech and singing to encompass the most information that might be necessary for the analyses conducted in Chapter 3.

1.1.1. Phonology as a branch of linguistics

Phonology is the study of a language's sound patterns. It is a branch of linguistics concerned with the systematic structuring of sounds and their utilization to transmit meaning in a certain language. Phonology studies the various ways in which sounds may be joined to make words, as well as how these combinations are employed to produce meaningful communication.

Phonemes –the fundamental units of sound that differentiate one word from another – are the subject matter of phonology in a given language. Phonologists investigate how these phonemes may be paired and how they interact with one another to produce the sound patterns of a language. As an essential part of language research, phonology reveals how language is ordered and how it is utilized to express meaning. It is also important for comprehending and comparing different languages, as language sound systems vary greatly.

An American linguist Leonard Bloomfield was a pioneer of contemporary phonology. He contended that phonemes are the fundamental units of sound in language, determined by their contrastive function, which means they distinguish one word from another. Bloomfield's views influenced the creation of structural linguistics, which dominated linguistics in the mid-twentieth century.

Other noteworthy phonologists include Roman Jakobson, a co-founder of the Prague School of linguistics [37]. Recent researchers in the topic include John Goldsmith, who worked on the theory of autosegmental phonology [31], and Janet Pierrehumbert, who has made invaluable contributions to the field of phonological grammar and developed algorithms for detecting words and phrases in audio recordings [54; 55].

There are several theoretical approaches to phonology, each with their own set of assumptions and procedures:

Generative Phonology was pioneered by Morris Halle in the mid-twentieth century. It is predicated on the notion that phonological rules are formed by a collection of underlying abstract representations, which are then translated into the surface forms that humans actually make or experience [44]. The relevance of phonological characteristics, which are binary qualities that characterize the articulatory or acoustic aspects of speech sounds, is emphasized in Generative Phonology.

The phoneme is an important notion in Generative Phonology. In English, for example, the sounds /p/ and /b/ are contrastive, which means that switching them can affect the meaning of a word (as in minimal pairs "pat" and "bat") [12].

The concept of feature specifications is another key notion in Generative Phonology. The articulatory or acoustic qualities of speech sounds are described by features, which are binary attributes. The feature [+voice], for example, defines that a sound is created with vocal fold vibration, whereas the feature [-voice] implies absence of vocal fold vibration. These are used to characterize the phonetic qualities of sounds and are crucial in the rules that shape the phonological system.

Optimality Theory was developed by Alan Prince and Paul Smolensky in the 1993. It is based on the premise that phonological rules adjust constantly to fulfill

conflicting constraints. In this theory, the purpose of phonological analysis is to find the best solution that optimizes the fulfillment of these constraints [57].

These constraints are rated in descending order of importance, with some constraints being more significant than others. When two or more constraints clash, the more essential one wins, and thus the optimal pronunciation is chosen.

For instance, the plural suffix "-s" is pronounced as /s/ in certain nouns, such as ‘cats’, but as /z/ in others, such as ‘dogs’. The ranking of constraints determines whether /s/ or /z/ is used, according to the Optimality Theory. One restriction may be "avoid voiced obstruents in final position," while another could be "avoid the use of marked sounds." The best pronunciation will be the one that meets the most stringent requirements.

Usage-Based Phonology stresses the importance of usage and experience in creating a language's phonological system. It implies that phonological patterns develop from the regularities in the speech that we perceive and reproduce, rather than from abstract rules or restrictions [14]. The regularities are subsequently stored in the mental lexicon and employed in language creation and understanding. The patterns can vary and evolve over time as language usage changes.

This approach is founded on the notion that language is not an abstract system, but rather an emergent phenomenon resulting from the interplay of the linguistic system and the socio-cognitive environment in which it is utilized. Rather than analyzing abstract principles, the emphasis is placed on the examination of usage events and the patterns that arise from them [64].

Usage-Based Phonology has been used to explain a wide range of phonological phenomena, including phonetic detail in speech, phonological variation and change, and the formation of sound patterns in infant language acquisition. It has also been used in other areas of linguistics, such as syntax and semantics.

Articulatory Phonology emphasizes the relevance of articulatory phonetics in phonological analysis by focusing on the articulatory actions involved in speech sounds production. It implies that phonological patterns may be described in terms of coordinated vocal tract motions rather than abstract representations or limitations [13].

The coordination of a succession of motor gestures, such as the movement of the tongue, lips, and vocal cords, which form the vocal tract and produce sound, are arranged into gestural scores, which indicate the motions' temporal and spatial correlations. Both phonetic detail and phonological patterns, such as coarticulation, assimilation, and vowel reduction, can be accounted for by gestural scores. For instance, coarticulation is described as the overlap of the gestural scores of neighboring sounds.

Articulatory Phonology also implies that, depending on parameters such as speech pace, emphasis, and context, the same phonological pattern can be achieved through multiple articulatory methods [13]. This variation is reflected in the gestural ratings, which may be altered to accommodate for articulation discrepancies.

Articulatory Phonology has been used to explain a variety of phonological phenomena, such as sound change, dialect diversity, and speech problems. It's also been used to create models of speech production and perception, as well as to guide speech treatment procedures.

1.1.2. Application of acoustics in linguistics

Acoustics is a discipline of physics that studies sound and its generation, transmission, and reception. It studies the physical characteristics of sound waves, such as frequency, amplitude, wavelength, velocity, and pressure. It is a vast and multidisciplinary science that comprises, inter alia, architectural acoustics, environmental acoustics, psychoacoustics, and musical acoustics [21]. Each sub-discipline of acoustics focuses on a specific aspect of the subject, such as the study of

sound in buildings, the consequences of noise pollution on individuals and the environment, sound perception by the human ear and brain, or the mechanics of musical instruments.

Acoustics is an essential and powerful instrument for conducting studies in linguistics, especially while researching speech sounds and language acoustics [63]. Linguistic acoustics envisages multidimensional measurement and analysis of sound waves produced during speech with the purpose of finding the acoustic signals utilized to communicate linguistic information.

One of the most significant applications of acoustics in linguistics is the study of phonetics. Acoustic analysis may be used to investigate the physical qualities of speech sounds, such as frequency, length, and intensity, as well as the timing and coordination of various articulatory motions required to produce those sounds [63]. This information may be used to establish and describe sounds of a language, as well as to understand how speakers and listeners produce and interpret them.

Acoustics is also employed in sociolinguistics and forensic linguistics. For example, it can be used in sociolinguistics to research the variance in speech patterns across different socioeconomic and regional groups. In forensic linguistics acoustic analysis can be applied to audio recordings to identify a speaker and detect deception. Acoustics has a number of methodologies applicable in linguistics and phonology.

Spectroscopy

Spectroscopy is a scientific approach for studying how matter interacts with electromagnetic radiation. In spectroscopy, radiation is channeled through a sample, and the resultant spectrum is measured and studied to discover the chemical composition, molecular structure, and physical characteristics of the sample [50].

In phonology, spectroscopy is used to examine speech sounds in particular. Linguists may analyze the frequency and intensity of several components of a speech sound, such as formants, which are responsible for vowel quality, and consonantal transitions, which are responsible for consonant quality, using spectroscopy.

Spectroscopy may also be used to investigate the qualities of sounds generated during singing, such as vocal timbre and the frequency content of various vowel and consonant sounds. For example, spectroscopy may be used to investigate how the resonance qualities of the vocal tract alter with different singing approaches or in different genres [50].

Spectroscopy is an effective method for studying speech and singing sounds. Its applications in linguistics and its branches are numerous, and they are constantly evolving with the development of new approaches and technology.

Waveform analysis

Waveform analysis is a technique for investigating the acoustic characteristics of sound waves. It entails representing the fluctuation of air pressure over time by displaying the sound wave as a waveform which may be studied to determine the sound's duration, intensity, frequency, and formants [51].

Waveform analysis is used in phonology to investigate the acoustic features of speech sounds and how they are created and interpreted by the human auditory system. The most important for this study is the fact that this analysis studies vowel formants, which are the resonant frequencies of the vocal tract during vowel production [51]. One could extract the formant frequencies, trace their envelopment in time and determine the articulatory and perceptual processes involved in vowel production and perception.

The study of intonation and prosody is another field of phonological research that employs waveform analysis [63]. Waveform analysis may be used to extract

variables like pitch contour and syllable length, which can reveal how speakers employ intonation and prosody to convey meaning and express emotions. What is relevant to this research, however, is that this analysis allows to analyze assimilatory patters in the contexts of different tonal environment.

Some of the prominent scholars on the intersection of waveform analysis and phonology are Janet Pierrehumbert and John Ohala. Pierrehumbert used waveform analysis to analyze intonation and prosody in numerous languages [54; 55], whereas Ohala used waveform analysis to study vowel formants and their function in phonological processes [49].

1.2. Theoretical foundation of the subject matter

This subsection of the study focuses on the categorization of assimilation in speech based on qualitative changes that assimilated consonants undergo. By examining how consonants undergo changes in their manner of articulation, voicing, or place of articulation when influenced by neighboring sounds, we can gain deeper insights into the intricate mechanisms of assimilation and its implications for speech production and perception.

1.2.1. Notion of assimilation in speech

Assimilation in speech is defined as: *"change of a sound in speech so that it becomes identical with or similar to a neighboring sound"* [16]. Such change can occur in various ways, as through voicing, acquiring nasality, changing place and manner of articulation. Assimilation is also differentiated by the order of sounds which influence the others' pronunciation – as regressive and progressive. The former term applies to the influence of the next sound on the pronunciation of the previous one, whereas the latter describes the opposite process. Such a change is predicated on the need to accommodate articulation of adjacent sounds, more so with the increasing speed of speech [71].

It is evident that assimilatory processes happen naturally and not deliberately in the speech of native speakers. Even more, assimilation has been proven to have sociolinguistic predications, namely – deliberate, although partial, incompliance with widely observed assimilatory patterns is perceived as classy, posh and high-style. At the same time, absence of assimilation in speech is a trait that oftentimes discerns non-native speakers, however good their general pronunciation is.

Assimilation can be studied synchronically and diachronically. The latter delves into assimilatory processes enveloping historically. For instance, the word ‘stem’ used to be pronounced as /stefn/ and changed to /stemn/ throughout the duration of Old English [9]. It should also be noted that such evolution does not necessarily follow the logic of assimilatory patterns and often directly contradicts it. Among such examples – addition of /k/ before /t/ into ‘Antarctica’, addition of /t/ into ‘often’ and many others. Synchronic study of assimilation deals with the processes that occur in speech to facilitate pronunciation, which will be described in more detail in Paragraph 1.2.

The notion of assimilation is very close to the notion of coarticulation – “the articulatory modification of a given speech sound arising from coproduction of neighboring sounds in the speech chain” [58]. Coarticulation is a phenomena in speech production in which the articulators (such as the tongue, lips, and jaw) overlap and affect articulation of separate sounds.

In other words, in the process of speech production the articulators are continually moving and adjusting in anticipation of the next sound to be produced. The articulatory movements for one sound can impact the articulatory gestures for surrounding sounds, thus adjusting acoustic properties of the sounds.

For example, while producing the word "key," the articulators move to generate the voiceless velar stop [k] while also preparing for the following [i] sound by elevating the tongue towards the roof of the mouth. This anticipatory movement alters the

acoustic qualities of the [k] sound, resulting in a somewhat different sound than the one produced in isolation or before open vowels.

Until recently, coarticulatory effects have been considered universal contrary to the assimilatory processes, which were deemed language-specific. Nevertheless, experimental evidence contradicted such a strict juxtaposition between the two notions, as coarticulation was found to have language-dependent patterns.

As evident from the definition of assimilation, classification of assimilation is related to the order of the influencing and influenced sounds. This and other types of assimilation are described in more detail below.

1.2.2. Classification of assimilatory processes

One of the ways to categorize assimilation is by differentiating between regressive and progressive assimilation. Regressive assimilation refers to the instances of sound change to accommodate the articulation of the following sound. E. g., when pronouncing the word ‘tenth’ the articulatory apparatus of a speaker anticipates the enunciation of the /θ/ sound already at the moment of articulation of the /n/ sound. This leads to /n/ shifting its point of articulation from alveolar ridge to front teeth /n̪/.

Progressive assimilation, contrary to the regressive one, encompasses the situations in which the sound changes as a result of articulation of the previous one. One of the most common examples of such assimilation is change of plural /s/ to /z/ when preceded by a voiced stop, as in ‘bags’, ‘loads’, etc. [Asian 401]

However, a better understanding of assimilatory processes and tendencies can be achieved when categorizing such instances based on the essence of the occurring change. Among such patterns are manner assimilation, palatalization, nasalization and voicing assimilation.

Manner assimilation

Manner assimilation occurs when a neighboring, usually following sound, induces its manner of articulation on a preceding sound. For instance, in North American variants of English alveolar stops /t/ and /d/ in intervocalic position reduce to a ‘flap’ [ɾ] – a very short voiced stop articulated by the tip of tongue and alveolar ridge [59]. This phenomenon does not occur, though, if the vowel following alveolar stops is stressed, as in ‘attain’/ əˈteɪn/.

Another example of manner assimilation is also dentalization of alveolars before dental fricatives, as in the word ‘breadth’ /bredθ/ → [bred̪θ] or [bret̪θ]. [17] As we can see, the /d/ sound assimilates not only its place of articulation to the following /θ/ sound, but can also acquire the voicelessness from it.

Palatalization

Palatalization is a type of regressive assimilation that occurs when a consonant is followed by a front vowel or [j] sound. Such consonant is being articulated with the blade of the tongue closer to the hard palate [10]. In the English language, as a result, an allophone of this consonant is pronounced, so it usually does not interfere with the perception of the intended word. One of the most frequent examples is yod-coalescence.

Yod -coalescence is the process by which the clusters /dj, tj, sj, zj/ are merged into the sibilants [dʒ, tʃ, ʃ, ʒ] respectively [43; 73]. It typically occurs before unstressed syllables, most often in the following instances:

- /tj/ → [tʃ] in -ture, such as ‘nature’ [ˈneɪtʃəʳ]
- /dj/ → [dʒ] in ‘soldier’ [ˈsoʊldʒəʳ]
- /sj/ → [ʃ] in -sure, -sion, -tion such as ‘pressure’ [ˈpɹɛʃəʳ]
- /zj/ → [ʒ] in vowel + -sure such as ‘measure’ [ˈmɛʒəʳ] (also vowel+sion).

Yod-coalescent tendencies also occur in between words, as in colloquial ‘got you’ /ˈgɒtʃə/, ‘what you’ /ˈwɒtʃə/, ‘bet you’ /betʃə/, ‘would you’ /wʊdʒə/, etc.

The palatalization of /t/ and /d/ in words like ‘truth’ and ‘drum’ is a typical trait of several English dialects, particularly certain types of British English. This is a well-known element of the Cockney accent, observed in other dialects of English, such as several regional accents in the United Kingdom (e.g., Geordie, Scouse, Brummie) and accents in other English-speaking nations, such as Ireland and Australia [28].

Nasalization

When a vowel is nasalized, the velum is lowered during production to allow air to enter through the nose, providing the sound with a distinctive "nasal" quality. As a rule, sounds are nasalized before nasal stops /m/, /n/, and /ŋ/, e. g. ‘camp’ /kæ̃mp/, ‘man’ /mæ̃n/, ‘bank’ /bæ̃ŋk/. Nasalization affects distinct vowel sounds differently, and the degree of nasalization varies between speakers and accents [71]. Nevertheless, some dialects have a higher degree of nasalization than others. The dialect of English spoken in some areas of Southern America, is known to have a significant degree of nasalization, particularly in /æ/, /i/ and /u/.

Voicing assimilation

Voicing assimilation is subdivided into voicing and devoicing. Voicing pertains to the acquisition of vocal cord vibration by originally voiceless sounds, whereas devoicing describes the fact of significant or complete reduction in the vocal cord vibration. Final fricative /s/ acquires voicing if it follows a voiced consonant, as in beds /bɛdz/, ‘cabs’ /kæbz/ [39]. Word-final voiced plosives, fricatives, and affricates are prone to becoming devoiced when they exist in isolated words, such as ‘bed’ /bed̥/, ‘badge’ /bæʤ̊/, in some accents of British English also /v/ as in /hæv̥/. This allows to make transitions between sounds smoother and more natural.

1.2.3. Previous research on assimilation in speech and in singing

There is not much research devoted to the topic of assimilation in singing. As a rule, the studies that apply acoustic analysis either focus on the musical part of the songs or only on the speech. Therefore, it was decided to compare their methodologies and findings and consider appropriate features for the methodology of this research.

Kolinsky R., Lidji P., Peretz I., Besson M. and Morais J., in their study "Processing interactions between phonology and melody: Vowels sing but consonants speak" conducted a series of experiments to determine whether the phonological and melodic parts of a song (lyrics and tunes) are processed together or separately [42].

Experiment 1 explored the processing of vowels and intervals, expecting an integrality pattern with interference cost and redundancy gain if they were interactive dimensions. In Experiment 2, nonwords with different voiceless stop consonants were used to predict a separability pattern, assuming consonants provide poor melodic support compared to speech-specific elements. Experiment 3 aimed to extend the results to other consonants and a new vowel contrast, considering acoustic and production differences. Sonority hierarchy and the degree of openness of the vocal apparatus were related to the processing of vowels and consonants. The aim of Experiment 4 was to examine interactions between consonants and melody in sung nonwords using a condensation test. Lastly, Experiment 5 used filtering and redundancy tests to ensure that the integrality between vowels and intervals was not solely due to acoustical interactions between vowel spectral characteristics and pitch, controlling synthesized parameters carefully.

Having analyzed the aggregated data of the 5 experiments, it was concluded that perception and processing of consonants are less dependent on the melodic information than of vowels. The findings support the idea that consonants are more separable from melodic processing than vowels in songs. Indeed, all studies with vowel-varying

materials (studies 1, 3, and 5) exhibited a consistent integrality pattern, with interference in the orthogonal condition and facilitation in the redundant condition. This was not the case in the studies with materials that differed in consonants (studies 2 and 3). Thus, patterns of consonants assimilation observed in speech should also be applicable to singing and may remain unaffected in singing.

Jansen W. investigated regressive voicing assimilation via a quantitative acoustic study of four Londoners [39]. The subjects of the study were asked to read phrases containing target consonant clusters with /k/, /g/, /ŋ/ followed by /t/, /d/, /s/, /z/ and /r/. The purpose of this research was to look at the phenomenon of voicing assimilation and give insights into its nature and modeling. The method applied was acoustic analysis using the PRAAT software.

The first problem addressed was the likelihood that the phonetic features of the triggering sounds influence voicing assimilation. Certain sounds, such as lax stops (/b/, /d/), were found to only trigger assimilation if they were of the prevoiced kind found in French. The findings confirmed the hypothesis that this phonetic conditioning extends to English lax /z/, which was partly voiced and induced regressive voicing assimilation. The lax plosive /d/, on the other hand, had a short voice onset time (VOT) and had no effect on the voicing of a preceding sound in comparison to the baseline context.

The patterning of the F1 during the vowels before the target clusters was also investigated. Vowels preceding tense obstruents in the second position were found to have a slightly elevated F1, but the presence of /z/ and /d/ in that position had a lesser lowering influence on F1. This revealed that /d/ might cause voicing assimilation, but in a more limited way than /z/, /t/, and /s/, which impacted both C1 and F1 voicing. The phrase "voicing assimilation" was first viewed as a monolithic notion comprising all

correlates of [tense], but separate consideration of the effects of the second consonant (C2) on the correlates indicated a potential artifact of this monolithic concept.

Due to constraints in stimulus control, the study did not examine the influence of C2 on the F1 of a subsequent vowel. However, regardless of VOT, lax stops tend to depress F1, thus /d/ operated as an F0 and perhaps F1 depressor. This implied that the effects of /z/ and /d/ on a preceding velar stop matched their phonetic features. While the disparity between C1 voicing and F1 effects raised some concerns, it did not call into doubt the idea that voicing assimilation is phonetically conditioned.

Satria H. Y. conducted research titled “The Phonological Process of Regressive and Progressive Assimilations on the Lyrics of the Rap Song “Rap God” by Eminem. The objective of the study was to find the determinant factor of assimilations’ place and manner [62]. The assimilatory patterns were found to have a correlation of 60-40 instances of regressive-progressive assimilation. 35 instances of assimilation were found and it was noted that use of those enable such a quick pace of the singer’s performance.

Moulidhanty T. and Wulandari J. conducted a phonetic study of modern German songs to detect the phonological processes of assimilation, vocal triggering of /r/, elision and apheresis [46]. The most frequent phonological pattern observed was elision with almost 4 times less cases of assimilation (27 to 7). In their research, they arrived at a conclusion that assimilatory processes, deliberate or not, did serve to facilitate the flow of lyrics, synchronize the lyrics with the melody by reduction of the number of syllables and, evidently, simplifying the pronunciation of the words in the songs.

At the same time, the two abovementioned researches did not describe what methodology was used to identify these phenomena so if the used method was mere listening analysis – it may be not objective enough. In addition, the study only covers

3 songs by one singer, which might constitute a relatively small database for such a research.

Renwick M., et al at the University of Oxford studied assimilation of word-final nasals to following word-initial consonants in the British English [60]. The researchers used forced alignment to find around 32 000 word pairs of interest in the Audio BNC dataset. They checked the alignment accuracy by listening to the tokens and excluding any pairings that were significantly mismatched. The study was limited even further to tokens with known speaker metadata, with a special emphasis on sex. A total of 14 000 word pairings were chosen for additional examination. To identify potential non-canonical assimilation, they looked for word pairings in which the first word ended in a nasal consonant and the second word began with an oral consonant.

The researchers utilized Praat acoustic analysis software to measure the F1, F2, and F3 frequencies in the aligned word pairs automatically. Formant frequencies were tested using normal settings, with the following differences for male and female speakers:

- Male – number of formants: 4; view range: 0 – 4500 Hz;
- Female – number of formants: 5; view range: 0 – 5000 Hz

The segment boundaries were determined to be accurate when the measurements were done at 10% fractions of each segment in the word pairs. The data were then averaged over deciles to get a single mean value for each parameter for each section. This enabled them to examine and compare formant frequencies in various language settings.

Only 3.3% of tokens in the listening test were judged to be clearly absorbed. In certain situations, they discovered substantial evidence of assimilation by word-final velar and bilabial nasals in over 4 000 word pairs from spontaneous English speech. The clearest evidence came from word combinations with more tokens, while

assimilation was less obvious in word pairs with fewer tokens. The findings show that phonological theory requires modification, and that a probabilistic approach to phonology, the one accounting for the parameters such as place of articulation and relative frequency of nasal word pairs, might better describe assimilation patterns.

Conclusions to Chapter 1

This chapter demonstrated that research assimilation in phonetics and phonology is a complex and understudied field that involves investigation of various aspects of sound and their change, considering the musical ambience. It reviews theoretical approaches, measurement software, and categories of assimilation in speech and singing. Different theoretical approaches to phonology such as Generative Phonology, Optimality Theory, Usage-Based Phonology, and Articulatory Phonology, were also described in this chapter.

Chapter 1 also summarizes possible applications of acoustics in phonetical and phonological researches, which allows for an impartial, objective and advanced study of speech sounds through examination of the physical characteristics of speech sounds, such as frequency, intensity, and timing, and understand how they are produced and perceived.

The notion of assimilation in speech is defined as the change of a sound to become identical or similar to a neighboring sound. It can occur through changes in manner of articulation, voicing, or place of articulation. Assimilation can be studied synchronically (current processes in speech) or diachronically (historical changes). Coarticulation, the overlapping of articulatory movements for neighboring sounds, is closely related to assimilation. Assimilatory processes can be categorized as regressive (influenced by following sounds) or progressive (influenced by preceding sounds). A deeper understanding of assimilation can be gained through the examination of qualitative changes in assimilated consonants that will be provided in Chapter 3.

CHAPTER 2. THE PHONETIC PROCEDURE OF THE STUDY

This section explains the methodology of the study. The principles of selection data for analysis and processing of the acquired data will be described here.

2.1. Data selection

To detect and compare the assimilatory patterns that take place in American and British variants of English, the songs of Ed Sheeran and Adele for British English and Lana del Rey and the Weekend for the North American variant of English were selected as objects of the study. The list of their songs is presented below:

Ed Sheeran:

1) “Dive” (2017) [19];
2) “Perfect” (2017) [47];
3) “Sing” (2014) [20];
4) “Thinking out loud” (2014) [48];

Adele:

1) “One and only” (2011) [41];
2) “Rolling in the deep” (2011) [2];
3) “Send my love” (2015) [5];
4) “Someone like you” (2011) [45];

Lana del Rey:

1) “Born to die” (2012) [53];
2) “Dark paradise” (2012) [22];
3) “West coast” (2014) [23];
4) “Young and beautiful” (2013) [32];

The Weeknd:

1) “Save your tears” (2020) [1];
2) “Starboy” (2016) [8];
3) “The hills” (2015) [15];
4) “What you need” (2011) [66].

These songs were selected due to availability of quality studio acapella versions that are suitable for spectrogram analysis. The texts of the songs are presented in Appendix 2. Such a composition represents both fast and slow paced songs, which allows for a more complete reflection of instances of assimilation in singing.

2.2. Sound analysis

This research is devoted to studying the assimilatory processes of consonants in the singers’ performances. The common practice in the field is to apply sound analysis, since it allows to ensure an impartial and objective analysis given sufficient quality of the studied material (recordings). This is the reason why songs were selected based on their aptitude to spectrogram analysis.

Spectrogram is a visual depiction of the frequency spectrum of a signal as it changes over time. It is extensively used in phonetics to analyze and investigate speech sounds. In the process of this research, the attention was paid to the areas of noise concentration some of which constitute formants. Formants are discrete frequency zones primarily but not exclusively associated with vowel sounds. From the practical point of view, formants represent concentration of noise on particular frequencies. The unit of measurement for formants is Hz, and depending on the frequencies at which these concentrations occur, the sound can be characterized as a vowel or consonant, sibilant or nasal, even as a voiced alveolar flap.

2.2.1. Software used for analysis

Praat was the sound analysis tool utilized. It is an open-source software created by Paul Boersma and David Weenink at the University of Amsterdam [56]. It allows to record mono and stereo sounds as well as edit and analyze them in terms of intensity, pitch height, duration, or formants by conversion of sound into a spectrogram. Thus, the following parameters were set for the spectrogram creation:

1) view range: 0 – 8000 Hz;
2) window length: 0.005 s;
3) dynamic range: 70 dB;

and for formant detection:

4) formant ceiling: 5000 Hz;
5) number of formants: 4;
6) window length: 0.025 s;
7) dynamic range: 30 dB.

These are the parameters applied in similar researches, with little adjustments. In this research it was decided to extend the default frequency range of 5000 Hz to 8000 Hz. This allowed to detect more clearly the nuclei of some consonant sounds, in particular fricatives, that are located in that range. The number of formants was reduced from 5 to 4 for a more stable visualization of formant contours in cases of imperfect quality of the studied sound.

2.2.2. Sound recognition

Within this study, the attention was paid to areas of noise concentration in general, as consonants are differentiated mostly by noise rather than sound. Nevertheless, liquid consonants (/l/, /m/, /r/, /n/) do not block the airflow completely,

allowing it to pass through nose or mouth. That is why they are detected on a spectrum by vowel-like formant patterns [11].

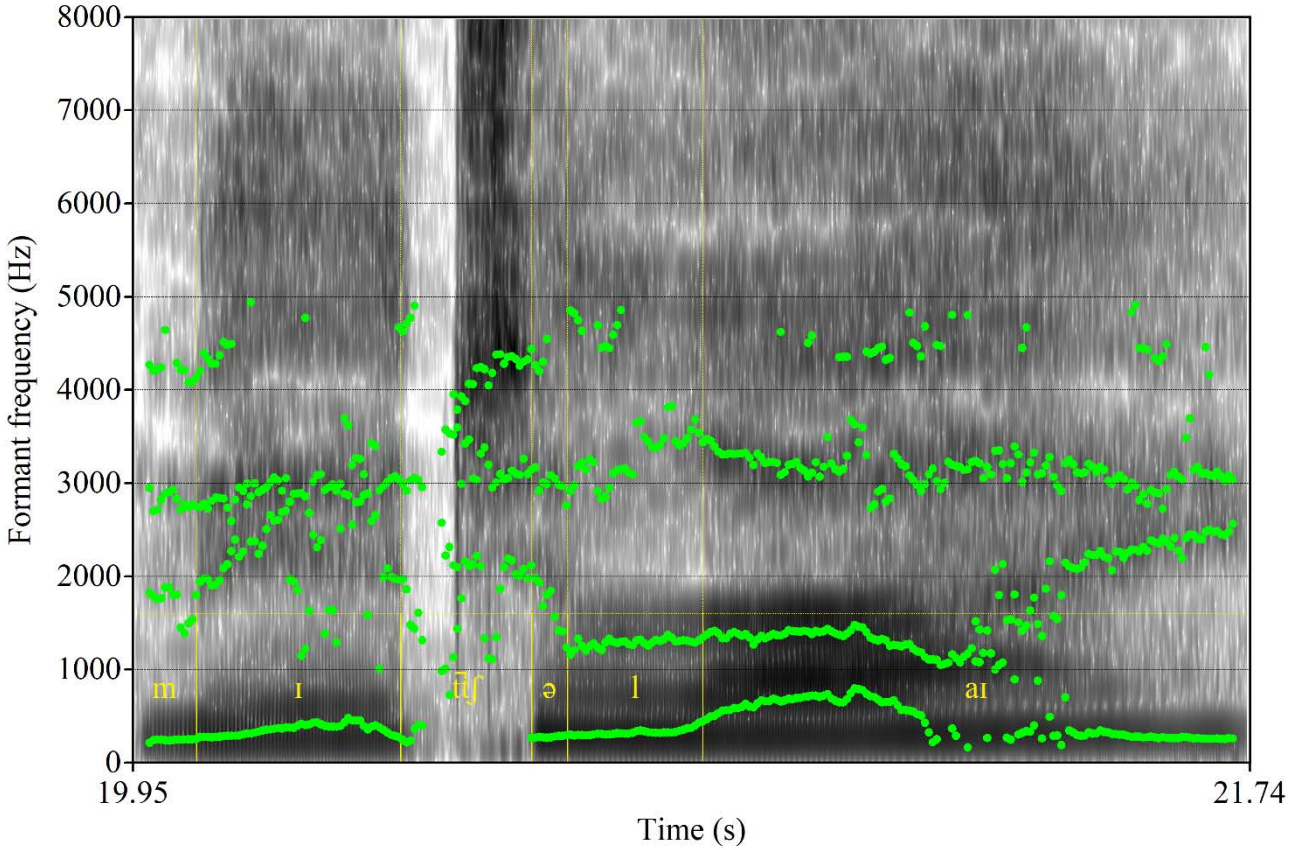

Figure 2.1. the spectrogram of the words ‘mid-July’

This spectrogram provides some examples of how liquids are reflected on a spectrum. The bilabial nasal /m/ is shown to have a significant amount of noise at the base level of ~200 Hz and formant contours, which signify its voiced character. Lateral alveolar approximant /l/ also is depicted to have both a basis at the level of F1 (~325 Hz) and an F2 value at the level of (~1280 Hz). Such characteristics resemble those of a vowel but it can be proven that it is indeed a liquid consonant owing to the significantly lower intensity of noise in comparison to the following diphthong /aɪ/, ever less expressed starting from F2 value and higher. The intensity of the sound is represented on the spectrogram as areas of white (silence), grey (low intensity) and black (high intensity) color. Thus, by such concentrations of sound intensities in particular regions it is possible to differentiate speech sounds between one another.

In addition, on this spectrogram we can see the instance of manner assimilation – the final voiced alveolar stop /d/ in ‘mid’ becomes applosive and the following voiced sibilant affricate /dʒ/ loses voicing so that /d/→/t̚/ with no audible release and /dʒ/→/tʃ/.

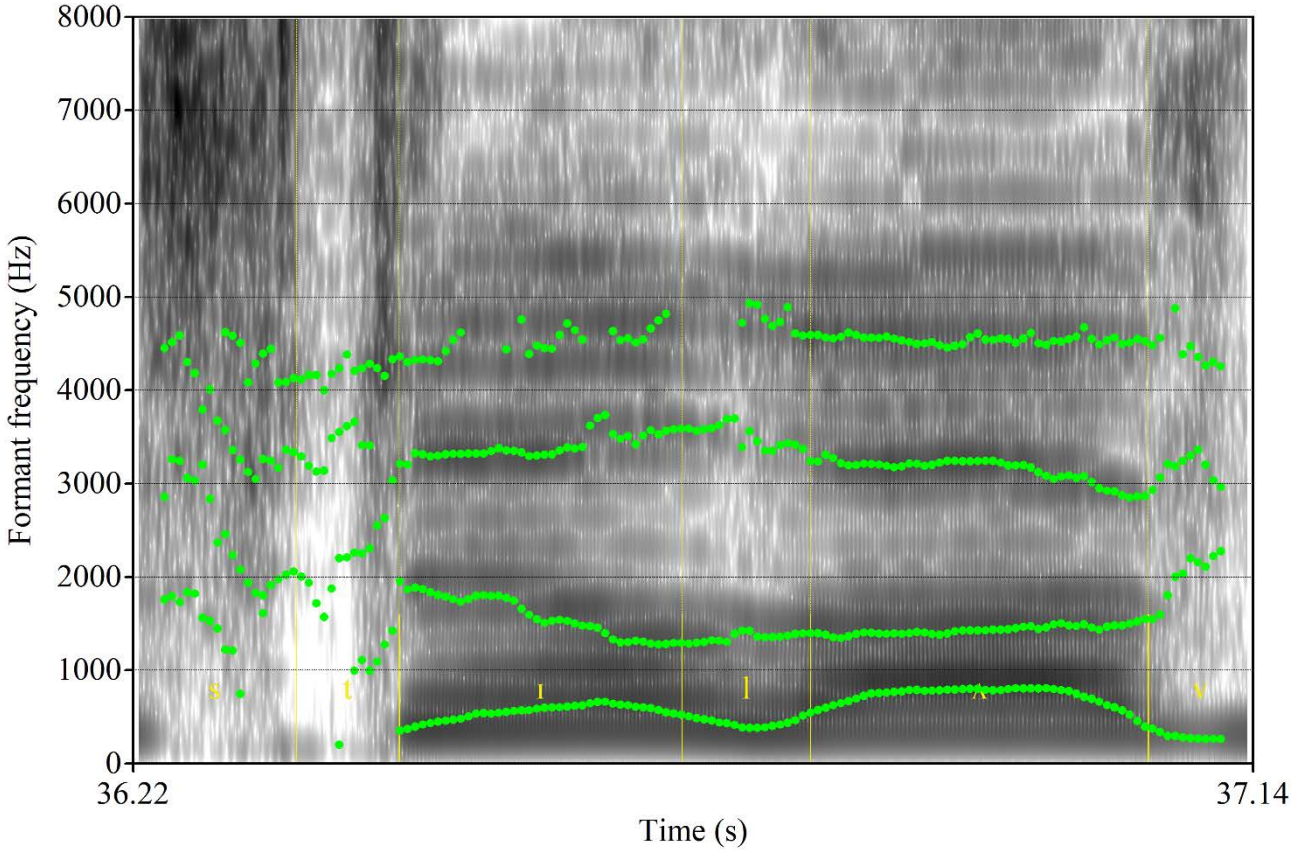

Figure 2.2. the spectrogram of the words 'still love'

This spectrogram provides insight into how sounds /s/, /t/, /v/ are depicted on the spectrum. Voiceless alveolar sibilant /s/ is characterized by high-pitched noise in the upper part of the spectrum (5000 Hz and higher). Voiceless alveolar plosive /t/ is characterized, by a short period of silence and subsequent release with the nucleus of the sound spanning from 4000 Hz and above. Both of the described sounds are proven to be voiceless because they lack a base-level noise, which /l/ and /v/ sounds have. Correspondingly, the voiced counterparts of /s/ and /t/ – /z/ and /d/ – will have the same base-level noise. The voiced non-sibilant labiodental fricative /v/ is also characterized by a small amount of noise in the upper part of the spectrum (6000 – 7000 Hz).

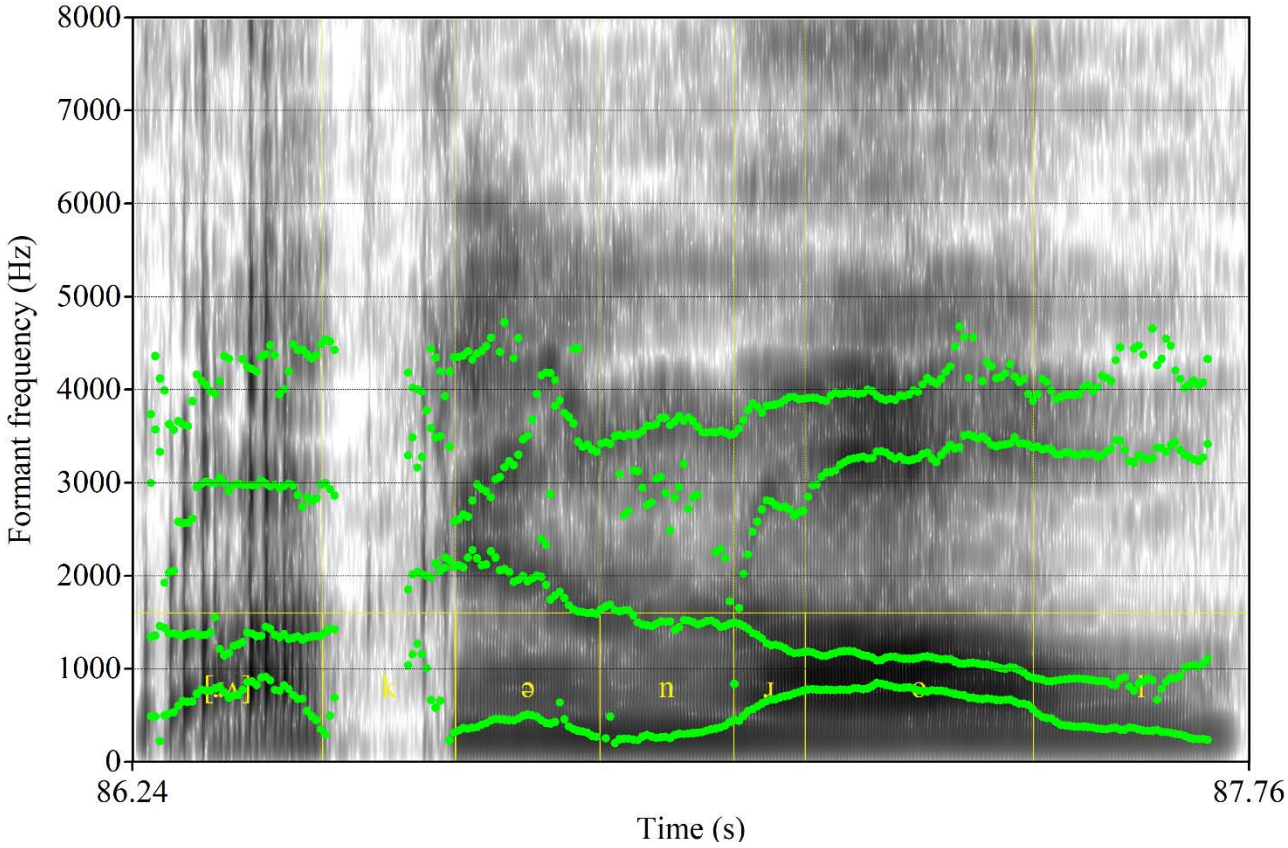

Figure 2.3. the spectrogram of the words ‘rock’n’roll’

This spectrogram demonstrates several things at once. First, we can see that the noise pattern of the syllable ‘ɹʌ’ is characterized rather as interrupted spikes of sound than a flowing signing. This is the effect of vocal fry on the recognition of sounds through spectrogram analysis, which effectively renders it impossible to research these patches of sound. We can then see how ‘ɹʌ’ syllable is followed by a period of silence until there appear two distinct individual spikes of sound with energy nucleus at ~2000 Hz. The presence of multiple spikes of sound after a period of silence marks a velar stop, in this case voiceless /k/, and thus they can be differentiated from other stops. The second spike represent a small portion of air that is released after the pressure is released but before the phonation of the next vowel.

The following consonants – /n/ and /ɹ/ – do not obstruct the airflow completely so they share some features with vowel sounds, in particular formants. The voiced alveolar nasal /n/ is characterized by base-level noise + F2 of ~1500 Hz. As formant

contours may vary in different cases, it is also useful to watch their movement at the on- and offset of articulation. For instance, both formants decrease at the transition from /ə/ to /n/, which is peculiar of nasal consonants. The next sound is a post-alveolar approximant /ɹ/ which is easily recognizable by the sudden drop and recovery of the third formant.

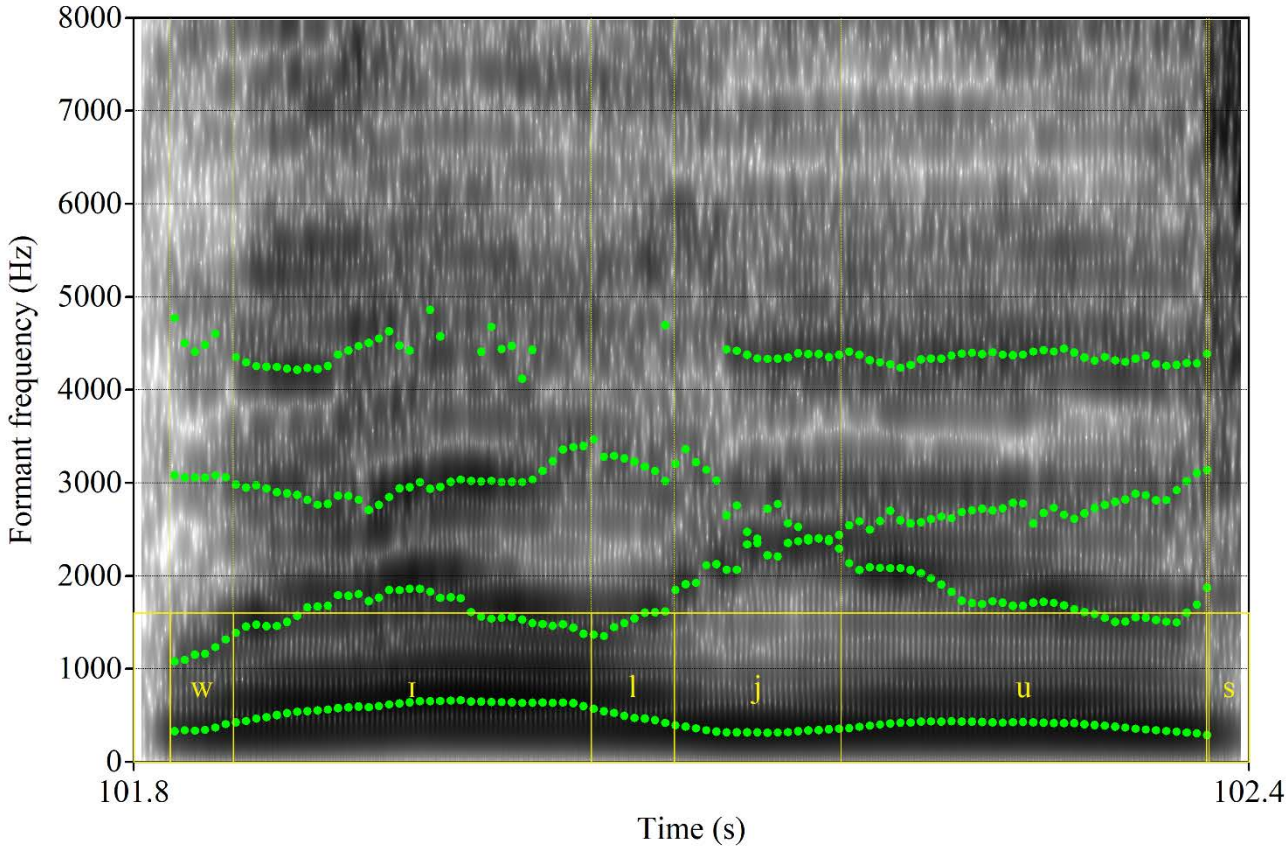

Figure 2.4. the spectrogram of the words ‘will you’

On the last spectrogram of this chapter the voiced labial–velar approximant /w/ and voiced palatal approximant /j/ will be considered. As is evident from the spectrogram, both sounds have vowel-like structure and hence formant contours since they do not obstruct but rather modify the airflow. /w/ sound is very similar to the vowel /u/ that also has low values of F1 and F2. /w/ sound is discerned from it by lower F2 and higher F3 and, of course, by a far shorter duration [glides]. The /j/ sound resembles /i/ sound but is easily differentiated by the arch-like movement of F2, which influences the onset of the following /u/ as well. Another peculiar feature of the /j/ sound is merger

of F2 and F3 on the spectrogram, which also helps to mark the exact duration of the glide.

More instances of consonants recognition on a spectrogram are provided in the next chapter, alongside with the demonstrations of assimilatory processes.

Conclusions to Chapter 2

The second chapter of the paper delves into the technique used, including data selection and sound analysis. To assess assimilatory tendencies in American and British English, the researchers chose songs by Ed Sheeran, Adele, Lana Del Rey, and The Weeknd. For spectrogram analysis, high-quality studio acapella versions of these songs were chosen. Praat, an open-source program, was used for sound analysis, with customized settings for spectrogram production and formant recognition that allowed for a more complete visual depiction of a sound's frequency spectrum across time, to facilitate the study of sounds.

The chapter also describes how to use spectrograms to show the identification of numerous consonants, detailing their properties and how they may be distinguished from one another. Examples of liquid consonants, voiceless and voiced fricatives, stops, nasals, and approximants, as well as spectrogram characteristics are included into it.

CHAPTER 3. ASSIMILATION IN SINGING

In this Chapter the findings of the study are reflected categorized by the analyzed accents, singers and types of assimilation. Both recurring assimilatory patterns and sole instances of unique assimilation types are presented. Some assumptions are suggested to justify the rationale behind such assimilation.

3.1. Cases of assimilation in BrE performers

First the study compares assimilatory patters within the group of BrE singers – Ed Sheeran and Adele.

3.1.1. Ed Sheeran

The results instances of assimilation were observed by results of analysis of the songs “Dive”, “Perfect” “Sing” Thinking out loud” are described below grouped by the type of assimilation.

Assimilation of manner was mostly observed in the cases when several consonants already sharing some common characteristics were to be pronounced one after another. However, as singing requires an almost uninterruptible air supply, one of the consonants was assimilated to accommodate for that need. The brightest examples of such assimilations are stops.

Alveolar stops /t/ and /d/, when occurring intervocalically, were instead pronounced as a flap /ɾ/. This feature was even more common in the fast-paced song “Sing”, where dental fricative /ð/ sound was also flapped intervocalically.

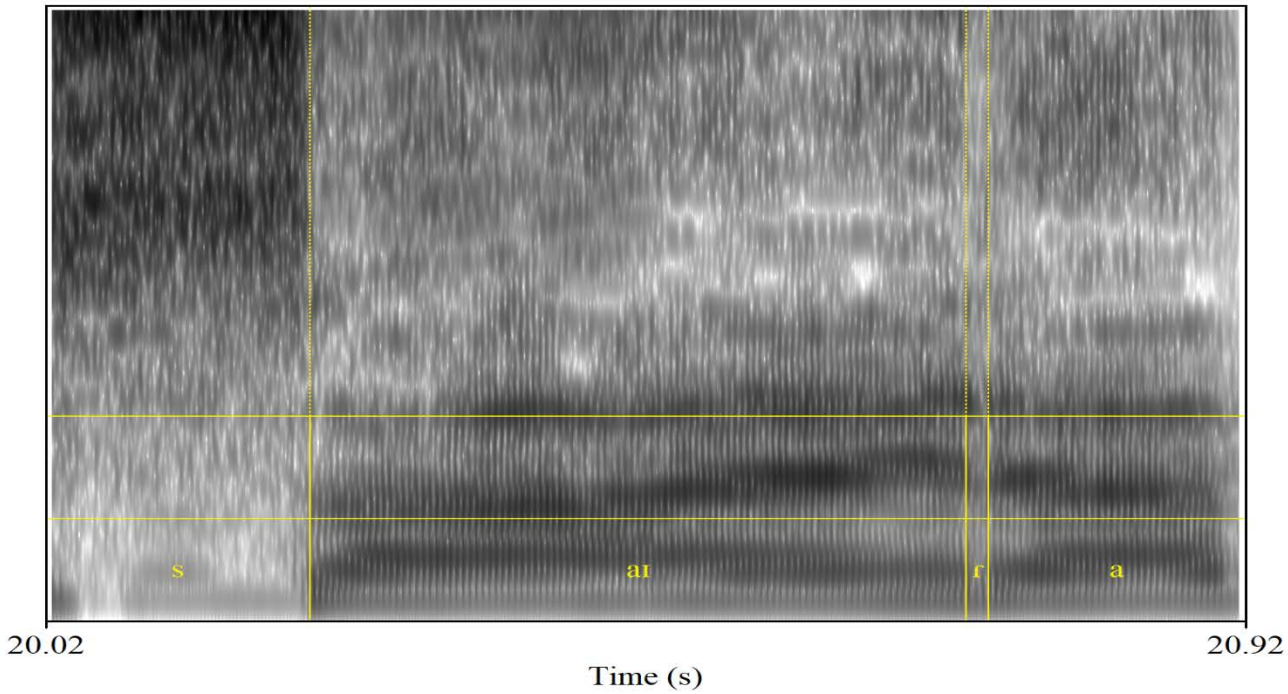

Figure 3.1. Instance of /d/ flapping in the words ‘side I’

When occurring intervocalically the /t/ sound has a tendency to be substituted for a glottal stop /ʔ/. The intervocalic flapping can be explained by the need to avoid

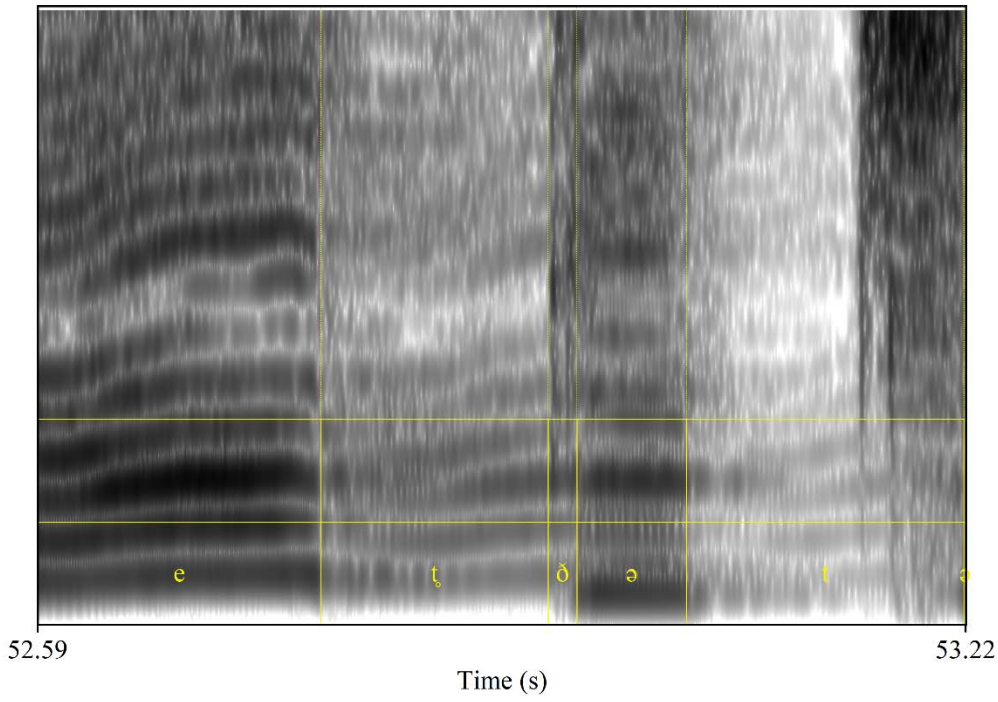

Figure 3.2. Instance of /t/ applosiveness in the words ‘set the’

elevating and lowering the jaw back for production of two vowels separated by a stop, which is why the preferred place of articulation of this stop becomes the glottis.

In some instances, the /t/ and /d/ sounds were assimilated to /l/, /ð/. Assimilation to the alveolar approximant /l/ and dental non-sibilant fricative /ð/ is possible owing to the fact that all these sounds are produced using the tongue pressing against alveola/teeth. Thus, only the obstructing phase of the stops' articulation is realized and the built-up tension is released in the following approximant/fricative.

The /k/ sound was also observed to have no audible release before alveolar stop /t/, probably since realization of two plosives in a row might be more time-consuming and strenuous as for only a small portion of an utterance, as in the word 'perfect' from the eponymous song. The pronunciation of the word followed the mentioned pattern throughout the entire song, however when it was the penultimate word of the song, both /k/ and /t/ sounds were articulated. It may be inferred that such an atypically distinct articulation of /kt/ is meant to reflect the emotional component of performance.

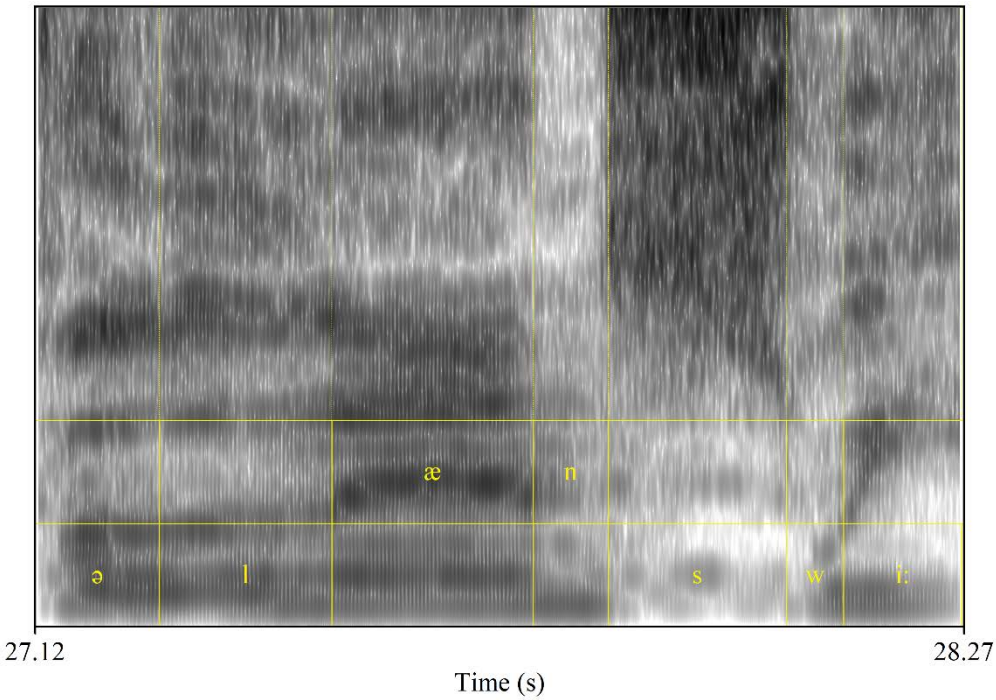

Figure 3.3 Assimilation of /d/ sound to /n/ in 'and'

Another instance of assimilation usually occurs in functional words, especially in the weak form of the word ‘and’ /ənd/ without any cues tying such an assimilation

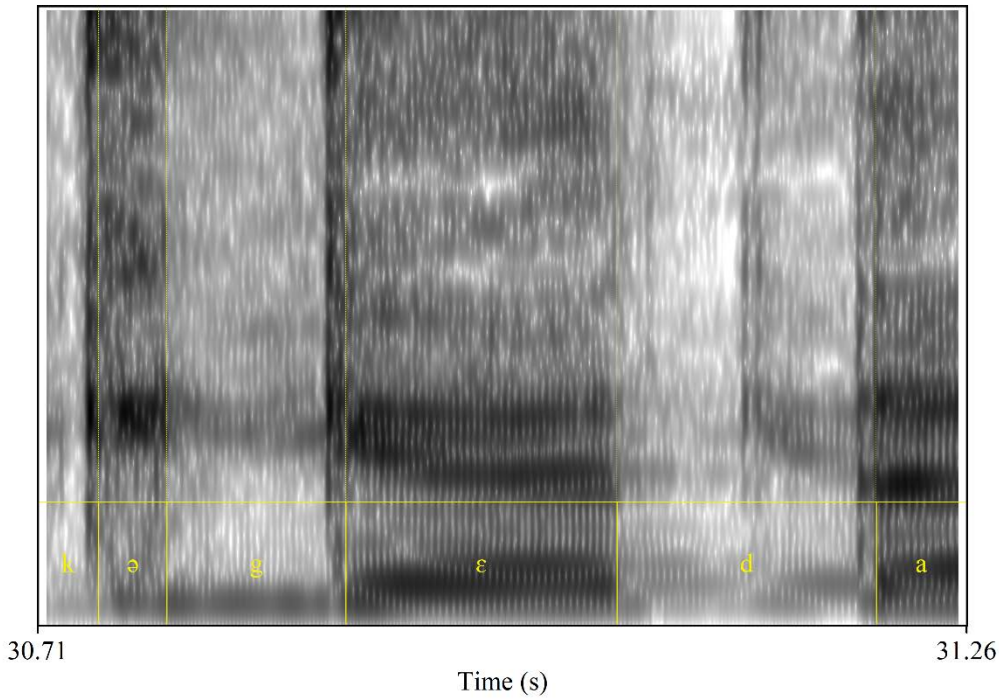

Figure 3.4 Reduction of stops in functional words ‘could get down’

to the following sound. The final /t/, /d/ and /ð/ sounds tend to assimilate to the preceding /n/ sound. This was a feature observed in all studied singers’ performances.

To add to the topic of assimilation in functional words, there were observed several more patterns. Firstly, /v/ sound in ‘of the’ is likely to assimilate to the following /ð/ sound. Secondly, when analyzing fast tempo singing of Ed Sheeran, the reduction of functional words should also be taken into consideration. Namely, in the song “Sing”, the words ‘could get down’ /kəd gɛt daʊn/ were reduced to /kə gɛ daʊn/. This drastic reduction can be explained by the fact that such a cluster of stops obstructs swift articulation.

There was observed one instance of voiced alveolar fricative /z/ assimilating to the following voiceless alveolar fricative /s/ in ‘eyes still’ /aɪz stɪl/ → /aɪ̥z stɪl/ in the song “Thinking out loud”.

In addition, palatalization of /t/ and /d/ into /tʃ/ and /dʒ/ sounds respectively occurred not only before /j/ sound (yod-coalescence) but also before the /ɹ/ sound, as in the words ‘truth’ /truːθ/ → /ʧruθ/.

Lastly, it was detected that the usual pattern of /r/ pronunciation was not adhered to in the performances. Intervocalic (linking) /r/ was omitted, even if within boundaries of one word, as in ‘forever’ /fəˈrɛvə/ → /fəˈɛvə/. In this particular case it would be sensible to suppose that the /ɹ/ is dropped to contribute to the emotional component of the utterance, as it allows an /ɛ/ sound with powerful attack to appear within the word.

3.1.2. Adele

As is the case in Ed Sheeran’s performances, the dominating share of assimilatory patterns observed was manner assimilation. This mostly concerned alveolar stops and dental non-sibilant fricatives.

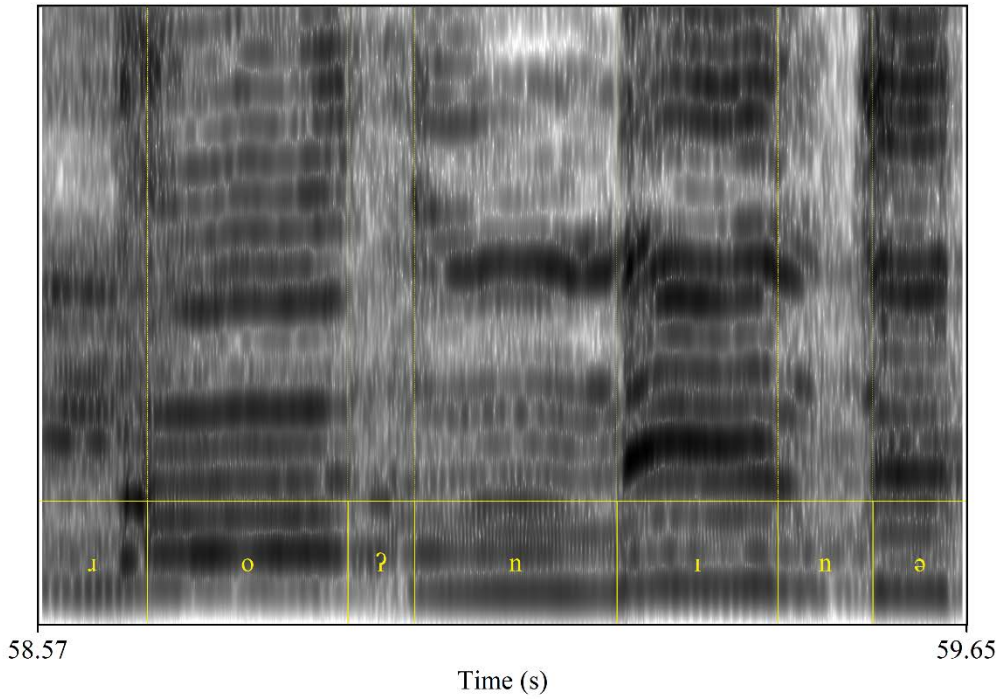

Figure 3.5. realization of /l/ as a glottal stop in ‘rolling in the’

Alveolar stops /t/ and /d/ have a tendency to be flapped intervocalically. This is a feature common for Londoners’ speech which from the point of view of singing obstructs the airflow for vowels’ phonation for a shorter period of time. The /t/ can

also be realized as a glottal stop intervocalically. At the same time, there was also one instance where /l/ in ‘rolling’ was also realized as a glottal stop in the song “Rolling in the deep”. This might be provoked by the rhythm of the utterance that emphasizes separate syllables ‘r**o**lling **i**n the’ whereas the unstressed ones are significantly underarticulated.

Manner assimilation also occurs in /t/ and /d/ sounds followed by /n/, /l/ and /θ/ sound because they share the place of articulation (alveola – teeth) and are all pronounced by tongue movements. The reason behind such assimilation may be simple accommodation for the purposes of smoother pronunciation, which is especially important in singing.

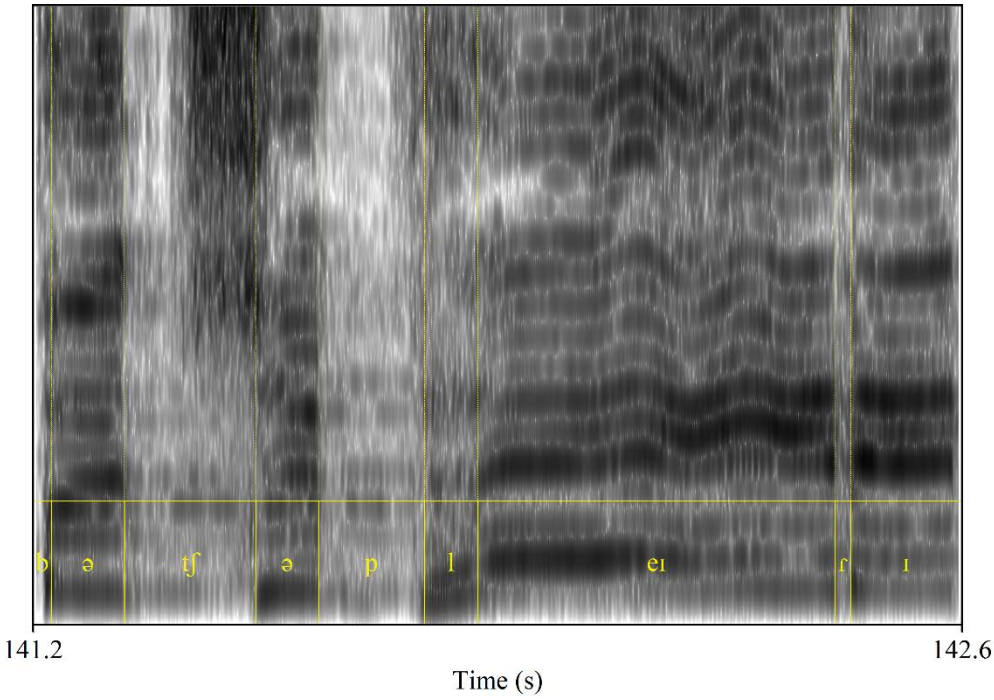

Figure 3.6. instance of /t/ palatalization and flapping

Another assimilatory feature is palatalization of the /t/ sound to /tʃ/ if followed by /j/ or /ɪ/ sounds. Presumably, Adele could also palatalize the /d/ sound in similar occasions, but it was not found based on the performances of the selected songs. Nevertheless, this is a feature common for all accents and studied singers.

Dental non-sibilant fricative /ð/ has a tendency to assimilate to the preceding /n/ sound, which is most usually realized in sequence ‘and the’. As noted above, the final /d/ assimilates to /n/ and in Adele’s performance so does the initial /ð/.

In fast paced songs, the /ð/ sound also tends to assimilate to the voiced alveolar flap /ɾ/ when occurring in between two vowels. This may be predicated on 1) the advantage of not having to elevate the jaw as much as for production of the /ð/ sound and 2) shortening the duration of the intervocalic obstruent, as a flap requires less time for phonation than a non-sibilant fricative. Assumingly according to the same logic, the sibilant fricative /s/ demonstrates a tendency to assimilate to the following /ʃ/ sound.

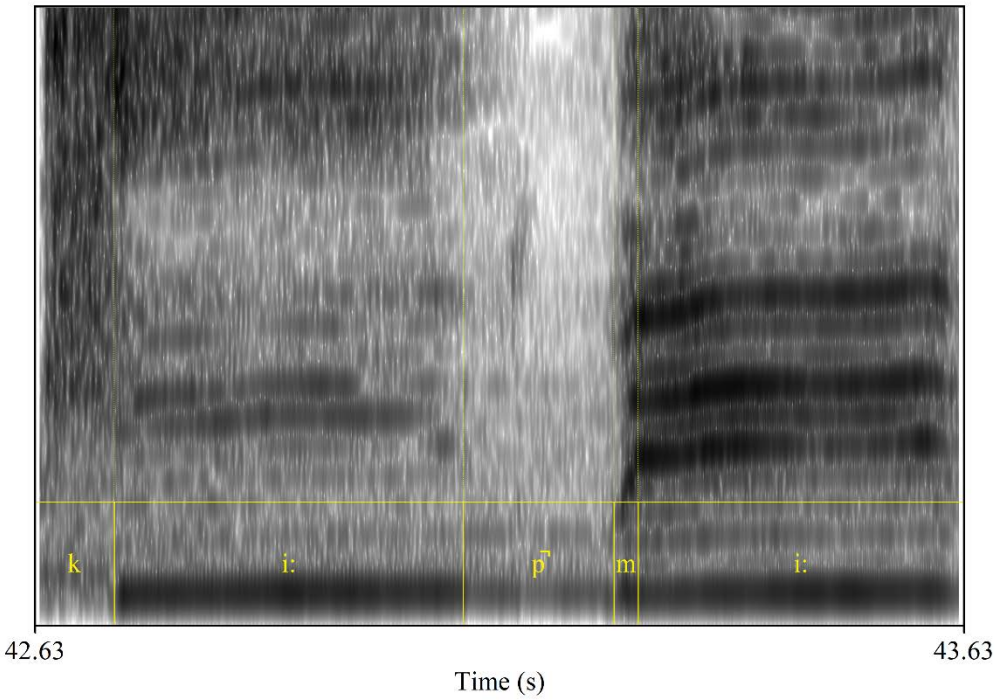

Figure 3.7. no audible release in 'keep me'

Another type of assimilation was observed with the voiceless bilabial plosive /p/ which can have no audible release before /m/ and /f/ sounds owing to the similar place of articulation of the sounds. Hence, the first stage of the stop – obstruction of the airflow – is being performed but not released. Instead, the pressure accumulated for explosive pronunciation of the /p/ sound is realized in the following nasal /m/ and non-sibilant fricative /f/.

Similarly, the /t/ and /d/ sounds are not realized as plosives before the /m/ sound due to coarticulation. Articulation of these stops and /m/ are parallel processes, but the articulatory movements necessary for /t/ and /d/ complement articulation of the /m/ sound as well. This allows for a shorter interruption of melody.

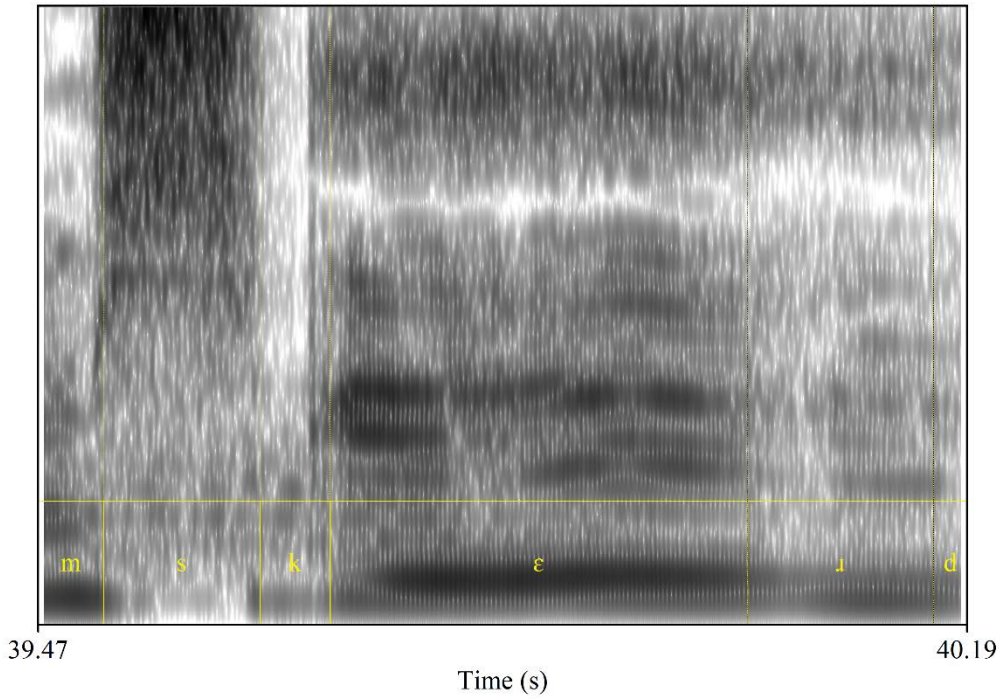

Figure 3.8. pronunciation of post-vocalic /r/

There were also some other changes that did not seem to comply with the expected pronunciation. For instance, for some reason the postvocalic /r/ sound in ‘worthy’, ‘arms’, ‘starts’, ‘ever’, ‘scared’ was pronounced on multiple occasions but a linking /r/ sound was not pronounced in ‘your arms’. A similar pattern was described in the works of Trudgill and Simpson who found that British singers starting in the mid-20th century incorporated some features of American English or switched to it completely. Recent study of Kate Nash – another Cockney pop singer – revealed that she incorporated circa 30 % of AmE features into her singing accent [38].

There was also noted a single instance of extreme reduction of a functional word ‘didn’t’ /dɪdnt/ that was pronounced as /dn̄t/. In this instance, it was not predicated on the fast tempo of the song or high pitch.

3.1.3. Common features of BrE performers

This subsection compares the assimilatory patterns observed in the BrE singer's performances. The patterns were categorized by type of assimilation, divided by the environment in which the assimilated consonants appear and artists. Single instances of assimilation were not included as they were not found to constitute a pattern. The highlighted are overlaps between assimilatory patterns of Adele and Ed Sheeran.

Assimilation type	Environment	Adele	Ed Sheeran
Flapping	V-t-V	✓	✓
	V-d-V	✓	✓
	V-ð-V	✓	✓
Glottal stop	V-t-V	✓	✓
No audible release	t-ð, d-ð		✓
	k-t		✓
	p-m, p-f	✓	
	t-d, t-m	✓	
Palatalization	t-j, t-r,	✓	✓
	d-j, d-r		✓
Manner	v-ð	✓	✓
	n-ð	✓	✓
	n-d	✓	✓
	t-l, d-l	✓	✓
	t-θ, d-θ	✓	
	s-ʃ	✓	

Table 3.1 Comparison of the BrE performers

The table shows that flapping and use of glottal stop overlap completely. Another significant overlap is evident in the assimilatory patterns of manner. The discrepancy between the patterns can also be caused by insufficiency of the studied material. Overall, it can be seen that the singers share more common features than differences.

3.2. Cases of assimilation in AmE performers

3.2.1. Lana del Rey

It should be noted that the music subgenre Lana del Rey is mostly working in is dream pop. Dream pop is an indie rock style that arose in the 1980s and is distinguished by ethereal, atmospheric soundscapes, hazy vocals, and frequently melancholy or introspective lyrics. Thus, songs of Lana del Rey are distinguished by slow tempo, layered orchestration, significant use of reverb and delay effects, and emphasis on creating an immersive and dreamy ambiance. Such a dreamy ambience is achieved through breathy and languid phrasing, which in turn influences articulation in her performance. One of such peculiarities is soft pronunciation of all consonants. Thus, the plosives are less aspirated, assimilated to neighboring sounds or dropped altogether (described in detail below). This might be predicated on the need to retain the lyrical, calm style of the music, which requires a more significant focus on vowels.

The most affected by such requirements is the alveolar stop /t/, For instance, it tends to have no audible release before /d/, as in ‘feet don’t’, as demonstrated on the figure above. Due to the same place of articulation, the air pressure accumulated for the /t/ sound is released in the following /d/.

When appearing intervocalically, /t/ and /d/ can be assimilated to a voiced alveolar flap. Additionally, voiceless alveolar stop /t/ can be realized as a glottal stop. However, there occurred one instance of glottal stopping that should be noted. It concerns realization of /d/ as a glottal stop in the word ‘couldn’t’ in the song “Born to

die". It is interesting that the nasal /n/ seems to have had enough of a vowel component for the singer to assimilate the /d/ to a glottal stop.

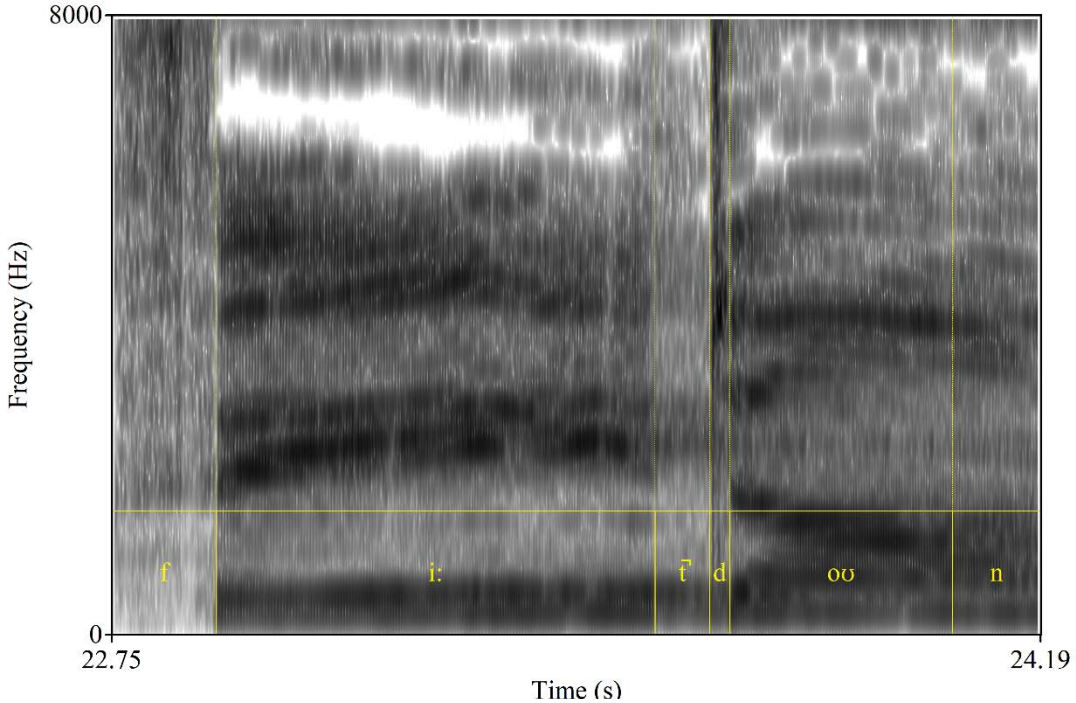

Figure 3.9. Instance of applosiveness of /t/ before /d/ in 'feet don't'

Some the examples of manner assimilation were observed in the voiced non-sibilant dental fricative /ð/. Firstly, it tends to assimilate to the preceding /n/ sound, which is mostly but not exclusively observed in the conjunction 'in/on + the'. This is possible owing to close places of articulation and similar articulatory movement.

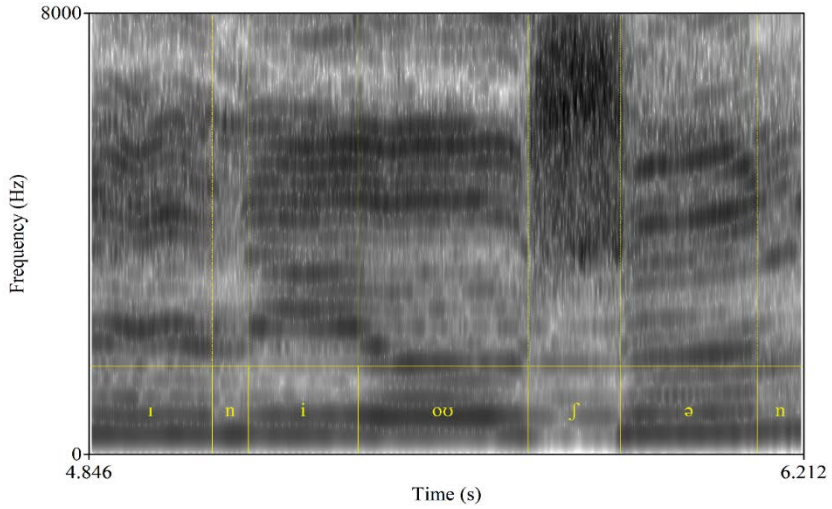

Figure 3.10. Instance of manner assimilation of /ð/ to /n/ in

Secondly, /ð/ tends to be assimilated to the preceding voiced alveolar lateral approximant /l/, as in ‘tell them’.

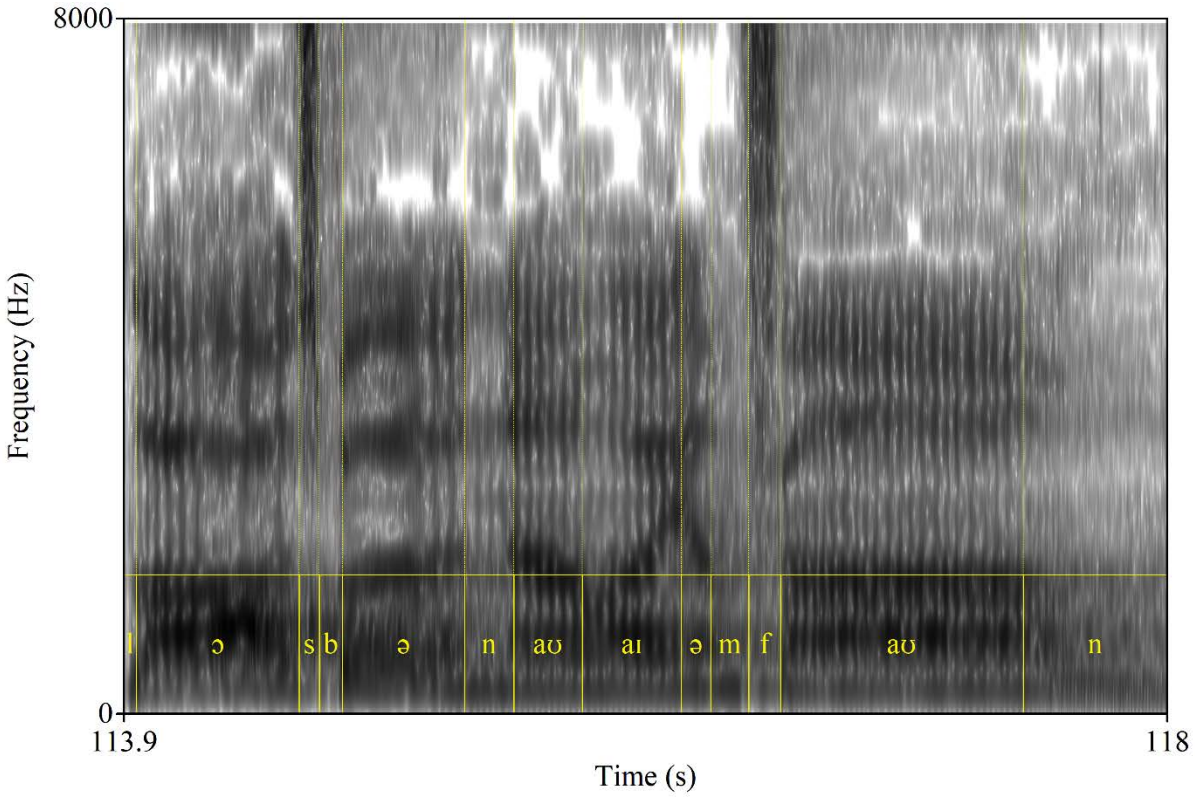

Figure 3.11. Assimilation of /t/ to the following /b/ and /n/; of utterance-final /d/ to the preceding /n/

Another assimilatory pattern of manner concerns /t/ before /b/ and /n/. In addition, the most numerous of Lana del Rey’s assimilatory patterns are instances of stops having no audible release. To begin with, final /t/ and /d/ (as in ‘it’, ‘don’t’, ‘can’t’, ‘won’t’, ‘and’, ‘side’) tend to have no audible release before other stops, like /g/ and /p/, or when they are the final sound in the utterance. The velar stop /k/ also usually has no audible release before /p/.

As regards palatalization, Lana del Rey tends to palatalize /d/ before /j/ sound (yod coalescence) and /t/ before /r/ sound. At the same time, she consistently shows no instances of /t/ palatalization before /j/, as observed in BrE singers. Instead, the /t/ is realized with no audible release.

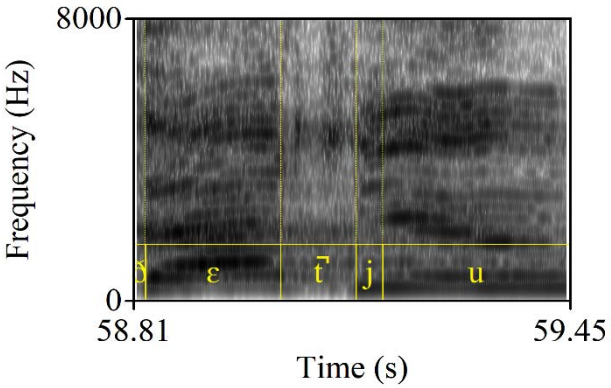

Figure 3.12. Instance of /t/ with no audible release before /j/

There were also two single instances of assimilatory patterns that should be noted. Firstly, in one instance /n/ was assimilated with the following /ɾ/ in the word ‘haunting’ in the song “Dark Paradise”. Thus, both /t/ and /n/ were assimilated to one flap that because of such assimilation occurs intervocalically.

Another instance concerned the voiceless bilabial stop /p/, which had no audible release before /m/ sound in ‘keep making’. This resembles the assimilatory pattern of applosiveness in speech, so one could look for more instances in other songs by Lana del Rey to test whether this constitutes a pattern.

3.2.2. The Weeknd

One of the features in the Weeknd’s performances shared between some singers is intervocalic /t/- and /d/-flapping, as well as /ð/-flapping in fast paced songs. This type

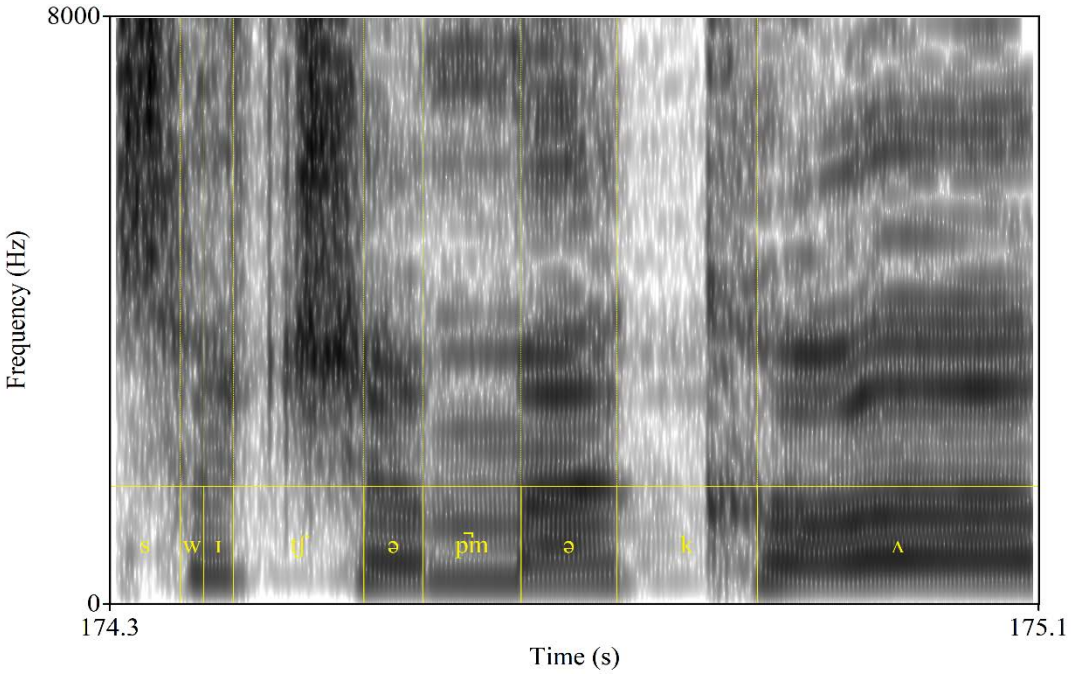

Figure 3.13. Instance of applosive /p/ before /m/ in 'up my'

of assimilation allows for a better phonation of vowels and smoother airflow with least obstruction possible. The voiceless alveolar stop /t/ can also be realized as a glottal stop intervocalically. This is a rising trend in the youth speech in the Mid-Atlantic states of the US, which border the home town of the Weeknd Toronto, presumably borrowed from the New York AAVE.

Another feature is applosiveness of the stops /t/, /d/, /k/ and /p/. Alveolar stops /t/ and /d/ tend to have no audible release when being the final sound of the utterance. The voiceless velar stop /k/ has a tendency to be unreleased before /t/, which is also a feature found in the performances of other studied singers. The voiceless bilabial plosive /p/ can become applosive before a bilabial nasal /m/.

The Weeknd also palatalizes both /t/ and /d/ before both /j/ and/r/ so that ‘trust’ becomes /tʃrʌst/ and ‘made your’ becomes /meɪʤə/. The alveolar stops can also assimilate to the following /m/, /n/ and /d/, as in ‘cut that’ /kʌd̪͡ðæɾ/, which also demonstrates the change in voicing due to assimilation. In one instance /t/ was found to assimilate to the following /l/ – ‘get loose’ “Starboy”.

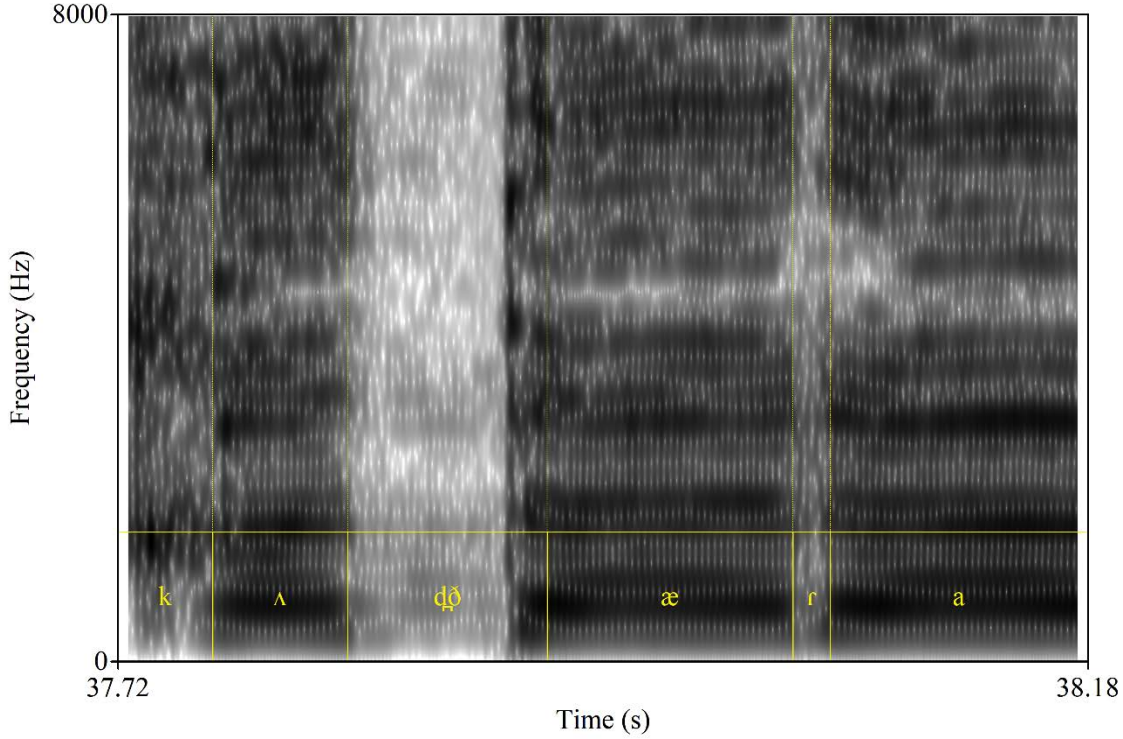

Figure 3.14 Instance of assimilation of /t/ to /d̪͡ð/ in ‘cut that’

To add to the topic of assimilation of alveolar stops, another feature observed in the singer's performances is elision of /t/ in the word 'just', regardless of environment it appears in. Voiced alveolar stop /d/ can be assimilated to the previous /n/ because they share the place of articulation (alveola) and are both pronounced by tongue movements. The reason behind such assimilation may simply be the need to accommodate a smoother pronunciation, which is especially important in singing.

The two remaining features – elision of /v/ in "of" and assimilation of /ð/ to the preceding /n/ sound also observed in other singers' performances.

3.2.3. Common features of AmE performers

This subsection compares the assimilatory patterns observed in the AmE singer's performances. The patterns were categorized by type of assimilation, divided by the environment in which the assimilated consonants appear and artists. Single instances of assimilation were not included as they were not found to constitute a pattern. The highlighted are overlaps between assimilatory patterns of Lana del Rey and The Weeknd.

Assimilation type	Environment	Lana del Rey	The Weeknd
Flapping	V-t-V	✓	✓
	V-d-V	✓	✓
	V-ð-V	✓	✓
Glottal stop	V-t-V	✓	✓
No audible release	t-d, t-m	✓	
	final t, d	✓	✓
	k-p	✓	
	k-t		✓

	t-g, t-p	✓	
Palatalization	t-j		✓
	t-r	✓	✓
	d-j	✓	✓
	d-r		✓
Manner	n-ð	✓	✓
	n-d	✓	✓
	t-b, t-n	✓	
	t-d, t-m		✓

Table 3.2 Comparison of the AmE performers

The table shows that flapping and use of glottal stop overlap completely. Another significant overlap is evident in the assimilatory patterns of manner. The discrepancy between the patterns can also be caused by insufficiency of the studied material. Overall, it can be seen that the singers share more common features than differences.

It was also decided to separately highlight a host of word conjunctions that are already recognized as informal contractions. Specifically, they contain the following instances of assimilation:

Conjunction	Pronunciation	Type of assimilation	Lana del Rey	The Weeknd
get you	/getʃə/	t → tʃ		✓
going to	/gɔn/	t → n		✓
got to	/gaɾə/	t → ɾ		✓
let me	/lemmi/	t → m	✓	✓

trying to	/tʃɹaɪnə/	t → n	✓	✓
want to	/wannə/	t → n	✓	✓

Table 3.3 Assimilation in contractions

3.3. Discussion

In this subsection the assimilatory patterns observed in performances of the four singers are compared. Full comparison table is presented in Appendix 1.

3.3.1. Assimilatory patterns of flapping and glottal stopping

The two assimilatory patterns that were common for all singers were flapping and glottal stopping.

Assimilation type	Environment	Adele	Ed Sheeran	Lana del Rey	The Weeknd
Flapping	V-t-V	✓	✓	✓	✓
	V-d-V	✓	✓	✓	✓
	V-ð-V	✓	✓	✓	✓
Glottal stop	V-t-V	✓	✓	✓	✓

Table 3.4 Assimilatory patterns shared by all singers

The reasons behind such a universal character of these types of assimilation may be related to:

1) availability of such assimilatory patterns in their native accents;
2) convenience of articulation.

As regards availability in the native accents of the singers, the North American accent of Mid-Atlantic states, the Received Pronunciation (RP) and Cockney accent all encapsule glottal stop as a part of their toolkit. Intervocalic use of the glottal stop (GS) is a growing trend among young speakers of the mentioned American accent (Lana del Rey, The Weeknd). It is also one of the key features of Cockney accent (Adele) and is

used in Modern RP (Ed Sheeran). The same is applicable to the use of alveolar stops' flapping, with the exception of RP. However, this is not the case for flapping /ð/. It could be assumed that such an assimilation occurred in two steps – /ð/ first assimilated to the /d/ sound, as a shorter alternative to the fricative, and then that /d/ became flapped. Such hypothesis, of course, impossible to prove based on the intel of this research and is rather an unconscious process that is hard to test in general. Nevertheless, assimilation of /ð/ to /d/ is a process observed in AmE speech so it is not completely ungrounded.

Concerning the convenience of articulation, there are several advantages to flapping /t/, /d/ and /ð/ intervocalically from the singing point of view. First, both a flap and a GS are alternatives with the shortest duration that at the same time do not deteriorate perception of the lyrics. This is not what is usually taken into account in speech, but in singing each and every syllable is fixed in the rhythm of the melody. Thus, saving any amount of time can contribute to accurate timing of articulation.

Second, a shorter duration of obstruction to the airflow is equivalent to a smoother, connected sound, which is paramount to a pleasant sound of pop singing. Third, articulation of a flap or a GS requires less air than either plosives or the fricative. Even if it may seem unimportant in speech, in singing breath management is crucial to smoothly sounding vocals. Thus, it could be another motivation behind such an assimilatory process.

3.3.2. No audible release

Assimilation that causes a consonant to have no audible release is observed in all singers' performances but with little consistency. Some of the shared features were applosiveness of /t/ before /d/ and /m/ and applosiveness of /k/ before /t/ sound. The first was utilized by Adele and Lana del Rey. Such accommodation might be gender-specific but more research data is required to test this hypothesis. The rationale behind

it might be related to the fact that pronunciation of two plosive consonants could be excessively challenging, use too much air and cause significant obstruction of airflow that interferes with the smoothness of sound, resulting in a harsh, unpleasant noise. While this might be appropriate for other styles of music, it is not peculiar of pop music to create any considerable dissonant sound.

Assimilation type	Environment	Adele	Ed Sheeran	Lana del Rey	The Weeknd
No audible release	t-ð		✓		
	d-ð		✓		
	k-t		✓		✓
	k-p			✓	
	p-m	✓			
	p-f	✓			
	t-d	✓		✓	
	t-m	✓		✓	
	t-g			✓	
	t-p			✓	
	utterance-final t			✓	✓
	utterance-final d			✓	✓

Table 3.5 Comparison of the patterns of no audible release

The same logic can be applied to the pattern of regressive assimilation of /k/ before the /t/ sound observed in performances of Ed Sheeran and The Weeknd. Utilization of applosives in clusters of consonants allows to realize the air compressed

for the preceding stop during the second one, saving time for articulation. It was also observed that it is common for /m/ to provoke loss of audible release of preceding consonants because it is articulated at the frontmost point of articulation, meaning that whatever articulatory movements take place deeper in the oral cavity they will have no audible release if an /m/ sound overlaps with them.

The last similarity between consonants acquiring no audible release was applosiveness of /t/ and /d/ sounds that are final sounds of an utterance or line that was observed in the performances of both AmE singers. This is a pattern that is oftentimes observed in the AmE speech as well, where it also applies to stress-final /t/ and /d/ sounds. The non-use of applosiveness by BrE singers, on the other hand, might be a conscious decision since the classic school of singing preaches distinct pronunciation of every sound, including consonants in final position that are not followed by any words. Thus, the use of this assimilatory pattern may contain a habitual component related directly to the singers' formation.

3.3.3. Palatalization

The instances of palatalization are more consistent cross-culturally. The feature shared by all singers is palatalization of /t/ before /r/, which is common for both American and British accents. Palatalization of /t/ and /d/ before /j/ – yod coalescence – also is observed in performances of all speakers, even though Lana del Rey does not palatalize /t/ before /r/ and Adele does the same with /d/ before /r/. This might be a feature of idiolect. The least shared feature is palatalization of /d/ sound before /r/, which is nevertheless present in the songs of Ed Sheeran and The Weeknd.

Assimilation type	Environment	Adele	Ed Sheeran	Lana del Rey	The Weeknd
Palatalization	t-j	✓	✓		✓

	t-r	✓	✓	✓	✓
	d-j		✓	✓	✓
	d-r		✓		✓

Table 3.6 Comparison of patterns of palatalization

Palatalization or non-palatalization do not seem to be justifiable from the point of view of singing articulation. It does reduce the time necessary to pronounce this cluster of consonants but that does not appear to be the fundamental reason for palatalization in singing. Most likely, instances of palatalization are predicated on the usual speech habits of the singers.

3.3.4. Assimilation of manner

The singers demonstrated varied instances of assimilation of manner with different levels of cross-accent consistency. The feature shared by all singers is assimilation of /d/ sound to the preceding /n/ consonant, most often occurring in the pronunciation of the word ‘and’, which is characteristic of both variants of English.

Assimilation type	Environment	Adele	Ed Sheeran	Lana del Rey	The Weeknd
Manner	v-ð	✓	✓		
	n-ð	✓	✓	✓	✓
	n-t		✓		
	n-d	✓	✓	✓	✓
	t-l	✓	✓		
	d-l	✓	✓		
	t-b			✓	
	t-n			✓	

	t-d				✓
	t-m				✓
	t-θ	✓			
	d-θ	✓			
	s-ʃ	✓			

Table 3.7 Comparison of patterns of manner assimilation

Another feature shared among all singers is assimilation of /ð/ sound to the previous /n/, which is similar to the abovementioned assimilation of /d/ to /n/. There are few similarities across accents, however, the table demonstrates that Adele is the singer to assimilate the manner of most sounds. It can be assumed to be connected with the fact that Adele's accent is Cockney, presupposing a wide range of assimilation in alveolar stops. At the same time, The Weeknd demonstrates least types of assimilation. In general, less assimilatory processes of manner were observed in the performances of AmE singers than in the BrE ones, with a few overlapping patterns.

3.4. Singing-specific assimilation

It is worth noting that the assimilatory patterns of spoken language still apply in singing. Singers, like speakers, utilize assimilation during vocal performances. The sounds naturally interact and affect each other as they go through melodies and words, resulting in subtle assimilation effects.

While vocalists strive for clear and exact diction, it is crucial to understand that assimilation is inherent in the act of vocalization to some level. However, due to the unique vocal methods used and the increased emphasis on giving a pleasant and emotive performance, the degree and frequency of assimilation in singing may differ from that of normal speaking.

While vocalists may deliberately adjust their pronunciation to improve vocal clarity and communicate emotions, the instances of assimilation that are utilized either spontaneously or deliberately add to the dynamic and fluid quality of vocal expression. By results of the research there were not found any assimilatory patterns that would be unique and not observed in speech.

Conclusions to Chapter 3

This chapter focused on the analysis of data obtained from the analysis of performances of North American and British singers, reflecting the results of this analysis as well as factors that could be of influence on the utilization of assimilation by the subjects of the study. By results of the analysis, it was not confirmed that singers utilize assimilatory patterns not peculiar to speech. On the contrary, some assimilatory opportunities observed to be realized in speech of respective accent were not realized in singing (palatalization of /d/ before /r/ by Adele and Lana del Rey). This might be due to habitual pronunciation of the singers in speech or singing (idiolect).

The results of assimilatory patterns comparison across accents did not reveal any significant correlation between the AmE and BrE singers, except for assimilation of alveolar stops /t/ and /d/ into an alveolar flap and assimilation of /t/ to a glottal stop intervocalically. Assimilations of manner proved to be the category with the highest number of unique instances but also the category with very low consistency across accents. The same applies to a somewhat less represented category of no audible release.

In addition, assimilation occurring within contractions of some words was also described with half of them shared between AmE singers. The BrE singers were not included into the comparison table because the consistent use of such contractions was not observed in their performance.

Overall, as noted in the introduction, this research is just a first step to detecting assimilatory patterns in singing. To build up on it further researches would require to encompass a larger number of subjects and a larger number of songs for a comprehensive study of as much consonant-consonant combinations as possible. It would also be advisable for upscaling research to use automatic software for segmentation of the recordings into respective sounds for a more efficient further analysis by researchers.

CONCLUSIONS

This research studied the assimilatory patterns of English observed in singing based on the performances of four singers – Adele, Ed Sheeran, (for British English) and Lana del Rey, The Weeknd (for North American English). Results of this study were expected to find what are assimilatory patterns in singing test whether assimilatory patterns in singing are different from the ones in speech, provide implications on how the modifications to musician's use of assimilatory processes can be commanded by signing and whether it provokes types of assimilation, not observed in speech. This was achieved through performance of the predetermined tasks, results of which are described below.

The first task of the study was to analyze instances of assimilation in performances of AmE and BrE singers. This was conducted on the basis of 16 songs by the abovementioned singers that provide a collection of material varying in their tempo, which allowed to also observe the influence the speed of articulation has on assimilation. The speech sounds were recognized by a method of spectrogram analysis and instances of assimilation were categorized according to the type of assimilation and the environment it occurs within. As regards the songs' tempo, it was noted that a higher number of unique assimilatory patters is utilized in the fast songs, such as "Sing", "Starboy", and to a lesser extent "Dark Paradise" and "Send my love".

The second task was to compare the recognized assimilatory patterns of the singers across accents. By results of this task there were found features, used by all singers, only by AmE singers, only by BrE singers and some individual patterns. The universal features for all accents were flapping of /t/, /d/ and /ð/ intervocalically, realization of /t/ as a glottal stop intervocalically, palatalization of /t/ before /r/ sound and assimilation of manner of /d/ and /ð/ to the preceding /n/ sound. It should be also

noted that palatalization of /d/ before /j/ is not shared only by Adele and pertains to the rest of singers and palatalization of /t/ before /j/ is not shared only by Lana del Rey.

Assimilations specific to the BrE singers were assimilation of manner of /ð/ to the preceding /v/ and of /t/ and /d/ to the following /l/ sound; specific to the AmE singers – applosiveness of utterance-final /t/ and /d/. There were also several assimilatory patterns that might be gender-specific. Namely, female singers share applosiveness of /t/ before /m/ and /d/ and male singers – applosiveness of /k/ before /t/ and palatalization of /d/ before /r/. However, there is not enough data to prove or disprove this hypothesis which may be subject to further research.

The third task was to assume reasons for the recognized assimilatory patterns. Even though different types of assimilation are provoked by different reasons, the following are universal ones behind any type of sound change. The first reason lies in the need to accommodate the articulation so that it becomes more convenient. The second – in the effort to preserve minimum obstruction to the airflow and avoid any dissonant unpleasant sounds interfering with the vocals. The third – in the need to save air when singing, since full-fledged articulation of two plosives in a row may be detrimental to the phrasing of the performer's lines.

The fourth, last task of the study was to separate the assimilatory pattern not observed in speech. By results of analysis, there were not found assimilation patterns that would not be also present in speech. They might not be universal to every singer or accent, but within the group of an accent all of assimilatory patterns complied with the established speech norms. Hence, the task was completed by finding that no such patterns were observed.

It should also be noted that although this study considers a more numerous sample of songs than of the prior studies mentioned earlier, this still might not signify

that the results are final, as assimilatory processes constitute the observed rules of pronunciation that nevertheless apply discretionally. Some instances of assimilation were not reflected in the final aggregated data for comparison because they were only detected once. Therefore, having a more extensive set of data on more singers would return more grounded results, including on the gender-specific patterns of assimilation.

REFERENCES

1. Acapella Library. The Weeknd - Save Your Tears (Acapella - Vocals Only), 2021. YouTube. URL: https://www.youtube.com/watch?v=UuH-_2JfTX0 (date of access: 22.01.2023).
2. AcapellasHD. Adele - Rolling In The Deep (Studio Acapella) (HD) + Download, 2011. YouTube. URL: https://www.youtube.com/watch?v=n84uLQanjBg (date of access: 19.01.2023).
3. Adams C. A. An acoustic phonetic analysis of African American English: A comparative study of two dialects. *Master's Theses and Doctoral Dissertation*. Ypsilanti : Eastern Michigan University. 2009. P. 84. URL: https://core.ac.uk/download/pdf/268101216.pdf
4. African American English : website. URL: https://www.uni-due.de/SVE/VARS_AfricanAmericanEnglish.htm. (date of access: 23.02.2023).
5. agbmashups. Adele - Send My Love (To Your New Lover) [Official Acapella], 2021. YouTube. URL: https://www.youtube.com/watch?v=0YEKWr_lh2w (date of access: 19.01.2023).
6. American English Phonetics. *Another American English Faculty Project*. Nijmegen, Netherlands : Radboud Universiteit : website. URL: https://americanphonetics.ruhosting.nl/course/11-fricatives-and-affricates/11-3the-glottal-fricative-h/ (date of access: 09.02.2023).
7. Anjali Bhatara, et al. Expression of Emotion in Music and Vocal Communication. Frontiers in Psychology. 2014. Vol. 5, no. 156:399. P. 2. URL: http://dx.doi.org/10.3389/fpsyg.2014.00399 (date of access: 09.02.2023).

8. Artists Access. The Weeknd - Starboy (Raw / Lead Acapella), 2021. YouTube. URL: https://www.youtube.com/watch?v=PVSNAMUPiF0 (date of access: 18.02.2023).

9. ASIAN 401“Introduction to Asian Linguistics”. *Historical Linguistics 2: Types of sound change*. URL: https://www.coursehero.com/file/12956458/asian401-sound-change/ (date of access: 10.02.2023).

10. Bateman N. On the typology of palatalization. *Language and linguistics compass*. 2011. Vol. 5, no. 8. P. 588-602. URL: http://dx.doi.org/10.1111/j.1749-818X.2011.00294.x (date of access: 13.02.2023).

11. Beginners guide to Praat. *What are formants?*: website. URL: https://person2.sol.lu.se/SidneyWood/praate/whatform.html. (date of access: 11.01.2023).

12. Brengelman F. Generative Phonology and the Teaching of Spelling. *The English Journal*. 1970. Vol. 59, no. 8. P. 1113–1118. URL: https://doi.org/10.2307/813523. (date of access: 11.03.2023).

13. Browman C. P., Goldstein L. Articulatory phonology: An overview. *Phonetica*. 1992, Vol. 49. no. 3-4. P. 155-180. URL: http://dx.doi.org/10.1159/000261913 (date of access: 13.03.2023).

14. Bybee J. Usage-based phonology. *Functionalism and formalism in linguistics*. 1999. Vol. 1. P. 211-242. URL: https://www.unm.edu/~jbybee/downloads/Bybee1999UsageBasedPhonology.pdf (date of access: 15.03.2023).

15. DanFanTW. The Weeknd - The Hills (Official Studio Acapella) (Clean), 2022. YouTube. URL: https://www.youtube.com/watch?v=XPzHEMfnKDc (date of access: 03.02.2023).

16. Definition of ASSIMILATION. Dictionary by Merriam-Webster: America's most-trusted online dictionary. URL: https://www.merriam-webster.com/dictionary/assimilation#:~:text=Assimilation%20refers%20to%20the%20process,life%20of%20an%20embracing%20culture (date of access: 11.03.2023).
17. Definition of Breadth. Cambridge Dictionary | English Dictionary, Translations & Thesaurus. URL: https://dictionary.cambridge.org/dictionary/english/breadth (date of access: 05.04.2023).
18. Dilley L. C., Pitt M. A. A study of regressive place assimilation in spontaneous speech and its implications for spoken word recognition. *The Journal of the Acoustical Society of America*. 2007. Vol. 122, no. 4. P. 2340–2353. URL: https://doi.org/10.1121/1.2772226 (date of access: 28.01.2023).
19. Ed Sheeran - Fan. Ed Sheeran - Dive [Official Acapella], 2022. YouTube. URL: https://www.youtube.com/watch?v=Rew_-X74eWU (date of access: 11.02.2023).
20. Ed Sheeran - Fan. Ed Sheeran - Sing (Official Studio Acapella), 2023. YouTube. URL: https://www.youtube.com/watch?v=3De2d3t-zKs (date of access: 21.01.2023).
21. Eide E. et al. A linguistic feature representation of the speech waveform. *IEEE International Conference on Acoustics, Speech, and Signal Processing*. IEEE, 1993. Vol. 2. 22 p. URL: https://doi.org/10.1121/1.2404622 (date of access: 01.04.2023).
22. Eugene RfR. Lana Del Rey - Dark Paradise (Filtered Lead vocals), 2022. YouTube. URL: https://www.youtube.com/watch?v=d_jxbtFezcw (date of access: 21.01.2023).

23. Fanáticos Del Rëy. Lana Del Rey - West Coast (Acapella studio Voice), 2018. YouTube. URL: https://www.youtube.com/watch?v=W1F2ggMp-Ok (date of access: 03.02.2023).

24. Febriyanti D. N. Assimilation, reduction and elision reflected in the selected song lyrics of Avenged Sevenfold. *Journal of Language and Literature*. 2015. Vol. 15, no. 1. P. 14-19. URL: https://doi.org/10.24071/joll.v15i1.369 (date of access: 04.04.2023).

25. Feld S. et al. Vocal anthropology: from the music of language to the language of song. *A companion to linguistic anthropology*. 2004. Vol. 47:321. P. 321 – 345. URL: http://dx.doi.org/10.1002/9780470996522.ch14 (date of access: 24.04.2023).

26. Flemming E. Speech perception and phonological contrast. *The handbook of speech perception*. 2005. P. 156-181. URL: http://dx.doi.org/10.1002/9780470757024.ch7 (date of access: 15.02.2023).

27. Flemming E. The relationship between coronal place and vowel backness. *Phonology*. 2003. Vol. 20, no. 3. P. 335-373. URL: https://www.jstor.org/stable/4420256 (date of access: 11.02.2023).

28. Friedlová M. Yod coalescence in the speech of native and non-native English speakers. 2016. *Bachelor Thesis*. 51p. URL: https://dspace.cuni.cz/bitstream/handle/20.500.11956/74207/BPTX_2014_2_11410_0_384331_0_164046.pdf?sequence=1&isAllowed=y (date of access: 13.04.2023).

29. Gaskell M. G. Modelling regressive and progressive effects of assimilation in speech perception. *Journal of Phonetics*. 2003. Vol. 31, no. 3-4. P. 447-463. URL: http://dx.doi.org/10.1016/S0095-4470(03)00012-3 (date of access: 02.04.2023).

30. Glides. Phonetic Sciences, Amsterdam. URL: https://www.fon.hum.uva.nl/rob/Courses/InformationInSpeech/CDROM/Literature/LOTwinterschool2006/speech.bme.ogi.edu/tutordemos/SpectrogramReading/cse551html/cse551/node17.html (date of access: 16.04.2023).

31. Goldsmith J. A. Autosegmental phonology. *Doctoral Dissertation*. Massachusetts Institute of Technology, 1976. 280 p. URL: http://www.ai.mit.edu/projects/dm/theses/goldsmith76.pdf (date of access: 05.02.2023).

32. Greice Kelly. Lana Del Rey - Young and beautiful (Acapella), 2016. YouTube. URL: https://www.youtube.com/watch?v=Iy-MWGYNvOg (date of access: 08.02.2023).

33. Hammarberg R. The metaphysics of coarticulation. *Journal of phonetics*. 1976. Vol. 4, no. 4. P. 353-36. URL: https://doi.org/10.1016/s0095-4470%2819%2931261-6 (date of access: 08.03.2023).

34. Hardcastle W. J., Hewlett N., Munhall K. G. Coarticulation: Theory, data, and techniques. *The Journal of the Acoustical Society of America*. 2001. Vol. 109, no. 1. P. 19-19. URL: http://www.sil.org:8090/silebr/2003/silebr2003-025 (date of access: 17.02.2023).

35. Hermastuti S. I., Isti'anah A. Consonant changes in Korean singers' pronunciation. *Journal of Language and Literature*. 2018. Vol. 18, no. 1. P. 28-35. URL: http://dx.doi.org/10.24071/joll.2018.180104 (date of access: 03.04.2023).

36. Iverson G. K., Sang-Cheol A. English voicing in dimensional theory. Language Sciences. 2007. Vol. 29, no. 2-3. P. 247-269. URL: https://doi.org/10.1016/j.langsci.2006.12.012 (date of access: 13.03.2023).

37. Jakobson R. Phonological studies. Walter de Gruyter, 2012. Vol. 1. 776 p..

38. Jansen L. Trudgill – Lisa Loves Linguistics. Lisa Loves Linguistics. URL: https://lisaloveslinguistics.wordpress.com/tag/trudgill/ (date of access: 18.01.2023).
39. Jansen W. Phonological 'voicing', phonetic voicing, and assimilation in English. *Language Sciences*. 2007. Vol. 29, no. 2-3. P. 270-293. URL: https://doi.org/10.1016/j.langsci.2006.12.021 (date of access: 13.03.2023).
40. Katamba F. An introduction to phonology. London: Longman, 1989. Vol. 48. 328 p. URL: https://www.academia.edu/6291073/An_Introduction_to_Phonology_Francis_Katamba (date of access: 13.01.2023).
41. Kilminant. Adele - One and Only (Official Acapella), 2020. YouTube. URL: https://www.youtube.com/watch?v=sHOXCCpg6k8 (date of access: 21.01.2023).
42. Kolinsky R et al. Processing interactions between phonology and melody: Vowels sing but consonants speak. *Cognition*. 2009. Vol. 112, no. 1. P. 1-20. URL: https://www.academia.edu/11585575/Processing_interactions_between_phonology_and_melody_Vowels_sing_but_consonants_speak (date of access: 26.02.2023).
43. Kul M. TOWARDS MODELLING YOD COALESCENCE IN AMERICAN ENGLISH. Adam Mickiewicz University. 2013. 3p. URL: https://patterns.uni-trier.de/wp-content/uploads/2020/04/Kul_Towards-modelling-yod-coalescence-in-American-English.pdf (date of access: 11.02.2023).
44. Liberman, Mark. Morris Halle: an appreciation. *Annual Review of Linguistics*. 2016. Vol. 2. P. 1-9. URL:

https://www.annualreviews.org/doi/abs/10.1146/annurev-linguistics-060515-105131 (date of access: 29.03.2023).

45. luvmadonna2. Adele - Someone Like You (Official Studio Acapella), 2013. YouTube. URL: https://www.youtube.com/watch?v=xTchyZ6gsMI (date of access: 01.02.2023).

46. Moulidhanty T. A. A., Wulandari J. Phonetic Analysis of German Songs. *International University Symposium on Humanities and Arts*. 2020 (INUSHARTS 2020). Atlantis Press, 2021. P. 302-312. URL: https://www.atlantis-press.com/proceedings/inusharts-20/125962557 (date of access: 12.04.2023).

47. MS Project Sound. Ed Sheeran - Perfect (Acapella - Vocals Only), 2017. YouTube. URL: https://www.youtube.com/watch?v=XMqEFuGA2cE (date of access: 04.02.2023).

48. MS Project Sound. Ed Sheeran - Thinking Out Loud (Official Acapella - Vocals Only) + DL, 2015. YouTube. URL: https://www.youtube.com/watch?v=byXb3KT1-3A (date of access: 22.01.2023).

49. Ohala J. J. Sound change is drawn from a pool of synchronic variation. *Language change: Contributions to the study of its causes*. 1989. P. 173-198. URL: https://www.degruyter.com/document/doi/10.1515/9783110853063/pdf#page=181 (date of access: 10.04.2023).

50. Pavia D. L. et al. Introduction to spectroscopy. *Cengage learning*. 2015. P. 721.

51. Pavlidis T. A LINGUISTIC MODEL FOR WAVEFORM ANALYSIS. PRINCETON UNIV NJ DEPT OF ELECTRICAL ENGINEERING, 1969. P.

22. URL: https://apps.dtic.mil/sti/citations/AD0684360 (date of access: 01.02.2023).

52. Pavlík R. A Typology of Assimilations. *SKASE Journal of theoretical linguistics*. 2009. Vol. 6, no. 1. URL: http://www.skase.sk/Volumes/JTL13/pdf_doc/01.pdf (date of access: 21.03.2023).

53. phenstex. Lana Del Rey - Born To Die (STUDIO ACAPELLA) Download in Description, 2012. YouTube. URL: https://www.youtube.com/watch?v=e0GFzhXbC6E (date of access: 19.01.2023).

54. Pierrehumbert J. The phonology and phonetics of English intonation. Doctoral Dissertation. Massachusetts Institute of Technology, 1980. URL: https://www.researchgate.net/publication/38004215_The_Phonology_and_Phonetics_of_English_Intonation (date of access: 28.02.2023).

55. Pierrehumbert, J. Tonal elements and their alignment. *Prosody: Theory and Experiment: Studies Presented to Gösta Bruce*. Springer Netherlands, 2000. URL: https://link.springer.com/chapter/10.1007/978-94-015-9413-4_2 (date of access: 08.04.2023).

56. Praat: doing phonetics by computer : website. URL: https://www.fon.hum.uva.nl/praat/ (date of access: 14.01.2023).

57. Prince A., Smolensky P. Optimality Theory: Constraint interaction in generative grammar. John Wiley & Sons, 2004. URL: https://roa.rutgers.edu/files/537-0802/537-0802-PRINCE-0-0.PDF (date of access: 23.03.2023).

58. Recasens D. Coarticulation. Oxford Research Encyclopedias. 2018. 53 p. URL: https://doi.org/10.1093/acrefore/9780199384655.013.416 (date of access: 23.03.2023).
59. Recasens D. 5. Manner assimilation and weakening. *The Production of Consonant Clusters: Implications for Phonology and Sound Change*. Berlin, Boston: De Gruyter Mouton, 2018. P. 144-186. URL: https://doi.org/10.1515/9783110568059-005 (date of access: 04.04.2023).
60. Renwick M., Baghai-Ravary L, Temple R., Coleman J. Assimilation of word-final nasals to following word-initial place of articulation in UK English. *Interspeech*. Lyon : France. P. 3047-3051. URL: https://www.isca-speech.org/archive/interspeech_2013/renwick13_interspeech.html (date of access: 18.02.2023).
61. Rutner S. Reduction of Vowels and Consonants in Connected Speech. GRIN Verlag, 2014. URL: https://m.hausarbeiten.de/document/274716 (date of access: 09.03.2023).
62. Satria H. Y. The Phonological Process of Regressive and Progressive Assimilations on the Lyrics of the Rap Song, Rap God by Eminem. Ninth International Conference on Applied Linguistics (CONAPLIN 9). 2016. P. 264–267. URL: https://doi.org/10.2991/conaplin-16.2017.59 (date of access: 09.03.2023).
63. Schmitt M., Ringeval F., Schuller B. At the border of acoustics and linguistics: Bag-of-audio-words for the recognition of emotions in speech. 2016. P. 495-499. URL: https://opus.bibliothek.uni-augsburg.de/opus4/files/72022/schmitt16_interspeech.pdf (date of access: 12.04.2023).

64. Silverman D. Usage-based phonology. *The Bloomsbury Companion to Phonology*. 2010. P. 369-394.

65. Simpson P. Language, culture and identity: With (another) look at accents in pop and rock singing. *Multilingua - Journal of Cross-Cultural and Interlanguage Communication*. Berlin, Germany: De Gruyter. 1999. Vo. 18, no. 4. P. 343-367. URL: http://dx.doi.org/10.1515/mult.1999.18.4.343 (date of access: 15.04.2023).

66. The Apollo Z. The Weeknd - What You Need (Studio Quality Acapella) [Vocals Only] With Lyrics, 2019. YouTube. URL: https://www.youtube.com/watch?v=Xc_ITnW9p2A (date of access: 10.02.2023).

67. Torres N. C. Voicing assimilation in Catalan and English. Universitat Autònoma de Barcelona, 2001. URL: https://ddd.uab.cat/record/36502 (date of access: 19.04.2023).

68. Trudgill P., Hannah J. International English. A Guide to Varieties of English Around the World : textbook. London, UK : Routledge. 2017. 176 p.

69. Vaux B., Samuels B. Explaining vowel systems: dispersion theory vs natural selection. *The Linguistic Review*. 2015. Vol. 32, no. 3. P. 573-599. URL: https://www.degruyter.com/document/doi/10.1515/tlr-2014-0028/html (date of access: 11.03.2023).

70. Wells J.C. Accents of English 2: The British Isles : textbook. Cambridge: Cambridge University Press, 1982. 208 p.

71. Williamson G. Assimilation of Manner. *Sltinfo*. URL: https://www.sltinfo.com/csp101-assimilaton-of-manner/ (date of access: 18.05.2023).

72. Wilson G. The sociolinguistics of singing: Dialect and style in classical choral singing in Trinidad. Münster: Monsenstein und Vannerdat, 2014. 341 p.

73. Yamamoto T. Word-initial Yod Coalescence in British English. URL: https://doi.org/10.18910/88407 (date of access: 30.04.2023).

74. Yan N. et al. Vocal tract dimensional characteristics of professional male and female singers with different types of singing voices. *International journal of speech-language pathology*. 2013. Vol. 15, no. 5. P. 484-491. URL: https://doi.org/10.3109/17549507.2012.744429 (date of access: 27.03.2023).

75. Yates K.W. Teaching Linguistic Mimicry to Improve Second Language Pronunciation : *MA thesis*. University of North Texas : ProQuest Information and Learning Company, 2003. 69 p.

76. Zhao R. How does the pronunciation of native languages affect beginning singers? A research focusing on native Mandarin Chinese and American English speaking singers. *Graduate Theses, Dissertations, and Problem Reports*. 2019. URL: https://doi.org/10.33915/etd.3857 (date of access: 05.03.2023).

APPENDICES

Appendix 1.

Comparative table of all assimilatory patterns observed

Assimilation type	Environment	Adele	Ed Sheeran	Lana del Rey	The Weeknd
Flapping	V-t-V	✓	✓	✓	✓
	V-d-V	✓	✓	✓	✓
	V-ð-V	✓	✓	✓	✓
Glottal stop	V-t-V	✓	✓	✓	✓
No audible release	t-ð		✓		
	d-ð		✓		
	k-t		✓		✓
	k-p			✓	
	p-m	✓			
	p-f	✓			
	t-d	✓		✓	
	t-m	✓		✓	
	t-g			✓	
	t-p			✓	
	utterance-final t			✓	✓
	utterance-final d			✓	✓

Palatalization	t-j	✓	✓		✓
	t-r	✓	✓	✓	✓
	d-j		✓	✓	✓
	d-r		✓		✓
Manner	v-ð	✓	✓		
	n-ð	✓	✓	✓	✓
	n-t		✓		
	n-d	✓	✓	✓	✓
	t-l	✓	✓		
	d-l	✓	✓		
	t-b			✓	
	t-n			✓	
	t-d				✓
	t-m				✓
	t-θ	✓			
	d-θ	✓			
	s-ʃ	✓			

Appendix 2.

Lyrics of the studied songs

Adele – One and only

You've been on my mind
I grow fonder every day
Lose myself in time
Just thinking of your face
God only knows why it's taken me
So long to let my doubts go
You're the only one that I want

I don't know why I'm scared
I've been here before
Every feeling, every word
I've imagined it all
You'll never know if you never try
To forgive your past and simply be mine

I dare you to let me be your, your one and only
I promise I'm worthy
To hold in your arms
So come on and give me the chance
To prove I am the one who can walk that mile
Until the end starts

If I've been on your mind
You hang on every word I say
Lose yourself in time
At the mention of my name
Will I ever know how it feels to hold you close
And have you tell me
Whichever road I choose, you'll go?

I don't know why I'm scared
'Cause I've been here before
Every feeling, every word
I've imagined it all
You'll never know if you never try
To forgive your past and simply be mine

I dare you to let me be your, your one and only
I promise I'm worthy

To hold in your arms
So come on and give me the chance
To prove I am the one who can walk that mile
Until the end starts

I know it ain't easy giving up your heart
I know it ain't easy giving up your heart
[cannot be analyzed because of overlaying voices]

So I dare you to let me be your, your one and only
I promise I'm worthy
To hold in your arms
So come on and give me the chance
To prove I am the one who can walk that mile
Until the end starts

Adele – Rolling in the deep

There's a fire starting in my heart
Reaching a fever pitch, it's bringing me out the dark
Finally I can see you crystal clear
Go ahead and sell me out and I'll lay your ship bare

See how I'll leave with every piece of you
Don't underestimate the things that I will do
There's a fire starting in my heart
Reaching a fever pitch and it's bringing me out the dark

The scars of your love remind me of us
They keep me thinking that we almost had it all
The scars of your love they leave me breathless
I can't help feeling

We could've had it all (you're gonna wish you)
(Never had met me)
Rolling in the deep (tears are gonna fall)
(Rolling in the deep)

You had my heart inside (you're gonna wish you)
Of your hands (never had met me)
And you played it (tears are gonna fall)
To the beat (rolling in the deep)

Baby, I have no story to be told
But I've heard one on you, now I'm gonna make your head burn
Think of me in the depths of your despair
Make a home down there, as mine sure won't be shared

The scars of your love remind me of us
They keep me thinking that we almost had it all
The scars of your love they leave me breathless
I can't help feeling

We could've had it all (you're gonna wish you)
(Never had met me)
Rolling in the deep (tears are gonna fall)
(Rolling in the deep)

You had my heart inside (you're gonna wish you)
Of your hands (never had met me)
And you played it (tears are gonna fall)
To the beat (rolling in the deep)

We could've had it all
Rolling in the deep
You had my heart inside of your hands
But you played it with a beating

Throw your soul through every open door (whoa)
Count your blessings to find what you look for (whoa)
Turn my sorrow into treasured gold (whoa)
You'll pay me back in kind and reap just what you've sown

We could've had it all (tears are gonna fall, rolling in the deep)
We could've had it all (you're gonna wish you never had met me)
It all, it all, it all (tears are gonna fall, rolling in the deep)

We could've had it all (you're gonna wish you)
(Never had met me)
Rolling in the deep (tears are gonna fall)
(Rolling in the deep)

You had my heart inside (you're gonna wish you)
Of your hands (never had met me)
But you played it, you played it, you played it
You played it to the beat

Adele – Send my love

This was all you, none of it me
You put your hands on, on my body and told me
You told me you were ready
For the big one, for the big jump
I'd be your last love, everlasting, you and me, mmm
That was what you told me

I'm giving you up
I've forgiven it all
You set me free

Send my love to your new lover
Treat her better
We've got to let go of all of our ghosts
We both know we ain't kids no more
Send my love to your new lover
Treat her better
We've got to let go of all of our ghosts
We both know we ain't kids no more

I was too strong, you were trembling
You couldn't handle the hot heat rising
Baby, I'm still rising
I was running, you were walking
You couldn't keep up, you were falling down
There's only one way down

I'm giving you up
I've forgiven it all
You set me free

Send my love to your new lover
Treat her better
We've got to let go of all of our ghosts
We both know we ain't kids no more
Send my love to your new lover
Treat her better
We've got to let go of all of our ghosts
We both know we ain't kids no more

If you're ready, if you're ready
If you're ready, I am ready

If you're ready, if you're ready
We both know we ain't kids no more
No, we ain't kids no more

Adele – Someone like you

I heard that you're settled down
That you found a girl and you're married now
I heard that your dreams came true
Guess she gave you things, I didn't give to you
Old friend, why are you so shy?
Ain't like you to hold back or hide from the light

I hate to turn up out of the blue, uninvited
But I couldn't stay away, I couldn't fight it
I had hoped you'd see my face
And that you'd be reminded that for me, it isn't over

Never mind, I'll find someone like you
I wish nothing but the best for you, too
"Don't forget me, " I beg
I remember you said
"Sometimes it lasts in love, but sometimes it hurts instead"
"Sometimes it lasts in love, but sometimes it hurts instead"

You know how the time flies
Only yesterday was the time of our lives
We were born and raised in a summer haze
Bound by the surprise of our glory days

I hate to turn up out of the blue, uninvited
But I couldn't stay away, I couldn't fight it
I had hoped you'd see my face
And that you'd be reminded that for me, it isn't over

Never mind, I'll find someone like you
I wish nothing but the best for you, too
"Don't forget me, " I beg
I remember you said
"Sometimes it lasts in love, but sometimes it hurts instead"

Nothing compares, no worries or cares
Regrets and mistakes, they're memories made
Who would have known how bittersweet this would taste?

Never mind, I'll find someone like you
I wish nothing but the best for you
"Don't forget me, " I beg
I remember you said

"Sometimes it lasts in love, but sometimes it hurts instead"
"Sometimes it lasts in love, but sometimes it hurts instead"
Never mind, I'll find someone like you
I wish nothing but the best for you
"Don't forget me, " I begged
I remember you said
"Sometimes it lasts in love, but sometimes it hurts instead"
"Sometimes it lasts in love, but sometimes it hurts instead"

Ed Sheeran – Dive

Oh, maybe I came on too strong
Maybe I waited too long
Oh, maybe I played my cards wrong
Oh, just a little bit wrong
Baby I apologize for it

I could fall and I could fly
Here in your aeroplane
And I could live, I could die
Hanging on the words you say
And I've been known to give my all
And jumping in harder than
Ten thousand rocks on the lake

So don't call me baby
Unless you mean it
Don't tell me you need me
If you don't believe it
So let me know the truth
Before I dive right in-to you

You're a mystery
I have traveled the world and there's no other girl like you
No one, what's your history?
Do you have a tendency to lead some people on?
'Cause I heard you do, mmh

I could fall or I could fly
Here in your aeroplane
And I could live, I could die
Hanging on the words you say
And I've been known to give my all
And lie awake, every day
Don't know how much I can take

So don't call me baby
Unless you mean it
Don't tell me you need me
If you don't believe it
So let me know the truth
Before I dive right into you

Ed Sheeran – Perfect

I found a love, for me
Darling, just dive right in and follow my lead
Well, I found a girl, beautiful and sweet
Oh, I never knew you were the someone waiting for me

'Cause we were just kids when we fell in love
Not knowing what it was
I will not give you up this time
But darling, just kiss me slow
Your heart is all I own
And in your eyes, you're holding mine

Baby, I'm dancing in the dark
With you between my arms
Barefoot on the grass
Listening to our favourite song
When you said you looked a mess
I whispered underneath my breath
But you heard it
Darling, you look perfect tonight

Well, I found a woman, stronger than anyone I know
She shares my dreams, I hope that someday I'll share her home
I found a lover, to carry more than just my secrets
To carry love, to carry children of our own

We are still kids, but we're so in love
Fighting against all odds
I know we'll be alright this time
Darling, just hold my hand
Be my girl, I'll be your man
I see my future in your eyes

Baby, I'm dancing in the dark
With you between my arms
Barefoot on the grass
Listening to our favourite song
When I saw you in that dress, looking so beautiful

I don't deserve this
Darling, you look perfect tonight

Baby, I'm dancing in the dark
With you between my arms
Barefoot on the grass
Listening to our favourite song
I have faith in what I see
Now I know I have met an angel in person
And she looks perfect
I don't deserve this
You look perfect tonight

Ed Sheeran – Sing

It's late in the evening
Glass on the side
I've been sat with you
For most of the night
Ignoring everybody here
We wish they would disappear
So maybe we could get down now

I don't want to know
If you're getting ahead of the program
I want you to be mine, lady
And to hold your body close
Take another step into the no-man's land
For the longest time lady

I need you darling
Come on set the tone
If you feel you're falling
Won't you let me know
If you love me
Come on, get involved
Feel it rushing through you
From your head to toe

Sing!
Louder!
Sing!

This love is a blaze
I saw flames from the side of the stage
And the fire brigade comes in a couple of days
Until then we got nothing to say and nothing to know
But something to drink and maybe something to smoke
Let it go until our roads are changed
Singing we found love in a local rave
No, I don't really know what I'm supposed to say
But I can just figure it out and hope and pray
I told her my name and said, "It's nice to meet ya."
Then she handed me a bottle of water filled with tequila.

I already know she's a keeper
Just from this one small act of kindness
I'm in deep shit if anybody finds out
I'm meant to drive home but I've drunk all of it now, not
Sobering up we just sit on the couch
One thing led to another
Now she's kissing my mouth

I need you darling
Come on set the tone
If you feel you're falling
Won't you let me know
If you love me
Come on, get involved
Feel it rushing through you
From your head to toe
Sing!

Can you feel it? All the guys in here don't even wanna dance
Can you feel it? All that I can hear is music from the back
Can you feel it?
Found you hiding here so won't you take my hand darling
Before the beat kicks in again
Can you feel it?
Can you feel it?

Ed Sheeran – Thinking out loud

When your legs don't work like they used to before
And I can't sweep you off of your feet
Will your mouth still remember the taste of my love
Will your eyes still smile from your cheeks

And darling I will be loving you 'til we're seventy
And baby my heart could still fall as hard at twenty three
And I'm thinking 'bout how people fall in love in mysterious ways
Maybe just the touch of a hand
Oh me I fall in love with you every single day
And I just want to tell you I am

So honey now
Take me into your loving arms
Kiss me under the light of a thousand stars
Place your head on my beating heart
I'm thinking out loud
Maybe we found love right where we are

When my hair's all but gone and my memory fades
And the crowds don't remember my name
When my hands don't play the strings the same way, mm
I know you will still love me the same

'Cause honey your soul could never grow old, it's evergreen
Baby your smile's forever in my mind and memory

I'm thinking 'bout how people fall in love in mysterious ways
Maybe it's all part of a plan
I'll just keep on making the same mistakes
Hoping that you'll understand

But baby now
Take me into your loving arms
Kiss me under the light of a thousand stars
Place your head on my beating heart
I'm thinking out loud
That maybe we found love right where we are, oh

So baby now
Take me into your loving arms
Kiss me under the light of a thousand stars
Place your head on my beating heart

I'm thinking out loud
That maybe we found love right where we are, oh

Oh maybe we found love right where we are
And we found love right where we are

Lana del Rey – Born to Die

Feet don't fail me now
Take me to the finish line
Oh my heart it breaks every step that I take
But I'm hoping that the gates, they'll tell me that you're mine
Walking through the city streets
Is it by mistake or design?
I feel so alone on a Friday night
Can you make it feel like home if I tell you you're mine?
It's like I told you, honey

Don't make me sad, don't make me cry
Sometimes love is not enough and the road gets tough, I don't know why
Keep making me laugh
Let's go get high
The road is long, we carry on
Try to have fun in the meantime

Come take a walk on the wild side
Let me kiss you hard in the pouring rain
You like your girls insane
So choose your last words, this is the last time
'Cause you and I, we were born to die

Lost but now I am found
I can see but once I was blind
I was so confused as a little child
Trying to take what I could get
Scared that I couldn't find
All the answers, honey

Don't make me sad, don't make me cry
Sometimes love is not enough and the road gets tough, I don't know why
Keep making me laugh
Let's go get high
The road is long, we carry on
Try to have fun in the meantime

Come take a walk on the wild side
Let me kiss you hard in the pouring rain
You like your girls insane
So choose your last words, this is the last time
'Cause you and I, we were born to die

Lana del Rey – Dark Paradise

All my friends tell me I should move on
I'm lying in the ocean, singing your song
Ahh
That's how you sang it

Loving you forever can't be wrong
Even though you're not here, won't move on
Ahh
That's how we played it

And there's no remedy for memory, your face is like a melody
It won't leave my head
Your soul is haunting me and telling me that everything is fine
But I wish I was dead (dead, like you)

Every time I close my eyes, it's like a dark paradise
No one compares to you
I'm scared that you won't be waiting on the other side
Every time I close my eyes, it's like a dark paradise
No one compares to you
I'm scared that you won't be waiting on the other side

All my friends ask me why I stay strong
Tell them when you find true love, it lives on
Ahh
That's why I stay here

And there's no remedy for memory, your face is like a melody
It won't leave my head
Your soul is haunting me and telling me that everything is fine
But I wish I was dead (dead, like you)

Every time I close my eyes, it's like a dark paradise
No one compares to you
I'm scared that you won't be waiting on the other side
Every time I close my eyes, it's like a dark paradise
No one compares to you
But there's no you, except in my dreams tonight

Oh-oh-oh-oh-hah-hah-hah-hah
I don't want to wake up from this tonight
Oh-oh-oh-oh-hah-hah-hah-hah
I don't want to wake up from this tonight

There's no relief, I see you in my sleep
And everybody's rushing me, but I can feel you touching me
There's no release, I feel you in my dreams
Telling me I'm fine

Every time I close my eyes, it's like a dark paradise
No one compares to you
I'm scared that you won't be waiting on the other side
Every time I close my eyes, it's like a dark paradise
No one compares to you
But there's no you, except in my dreams tonight

Oh-oh-oh-oh-hah-hah-hah-hah
I don't want to wake up from this tonight
Oh-oh-oh-oh-hah-hah-hah-hah
I don't want to wake up from this tonight

Down on the West Coast they got a sayin'
"If you're not drinkin' then you're not playin'"
But you've got the music, you've got the music
In you, don't you?
Down on the West Coast, I get this feeling like
It all could happen, that's why I'm leaving
You for the moment, you for the moment
Boy blue, yeah you

You're falling hard, I push away, I'm feeling hot to the touch
You say you miss me and I wanna say I miss you so much
But something keeps me really quiet, I'm alive, I'm a lush
Your love, your love, my love

I can see my baby swingin'
His Parliament's on fire and his hands are up
On the balcony and I'm singing
Ooh baby, ooh baby, I'm in love
I can see my sweet boy swaying
He's crazy y cubano como yo, la-la
On the balcony and I'm saying
Move baby, move baby, I'm in love
I'm in love (I'm in love)
I'm in love (I'm in love)

Down on the West Coast, they got their icons
Their silver starlets, their Queens of Saigons
And you've got the music, you've got the music
In you, don't you?
Down on the West Coast, they love their movies
Their golden gods and rock and roll groupies
And you've got the music, you've got the music
In you, don't you?

You push it hard, I pull away, I'm feeling hotter than fire
I guess that no one ever really made me feel that much higher
Te deseo, cariño, boy, it's you I desire
Your love, your love

I can see my baby swingin'
His Parliament's on fire and his hands are up
On the balcony and I'm singing
Ooh baby, ooh baby, I'm in love
I can see my sweet boy swaying
He's crazy y cubano como yo, la-la
On the balcony and I'm saying
Move baby, move baby, I'm in love

Lana del Rey – Young and Beautiful

I've seen the world, done it all, had my cake now
Diamonds, brilliant, and Bel Air now
Hot summer nights, mid-July
When you and I were forever wild
The crazy days, city lights
The way you'd play with me like a child

Will you still love me when I'm no longer young and beautiful?
Will you still love me when I got nothing but my aching soul?
I know you will, I know you will, I know that you will
Will you still love me when I'm no longer beautiful?

I've seen the world, lit it up as my stage now
Channelling angels in the new age now
Hot summer days, rock and roll
The way you'd play for me at your show
And all the ways I got to know
Your pretty face and electric soul

Will you still love me when I'm no longer young and beautiful?
Will you still love me when I got nothing but my aching soul?
I know you will, I know you will, I know that you will
Will you still love me when I'm no longer beautiful?

Dear Lord, when I get to Heaven
Please let me bring my man
When he comes, tell me that you'll let him in
Father, tell me if you can
All that grace, all that body
All that face makes me want to party
He's my sun, he makes me shine like diamonds

Will you still love me when I'm no longer young and beautiful?
Will you still love me when I got nothing but my aching soul?
I know you will, I know you will, I know that you will
Will you still love me when I'm no longer beautiful?

Will you still love me when I'm no longer beautiful?
Will you still love me when I'm no longer young and beautiful?

The Weeknd – Save your tears

I saw you dancing in a crowded room
You look so happy when I'm not with you
But then you saw me, caught you by surprise
A single teardrop falling from your eye

I don't know why I run away
I'll make you cry when I run away

You could've asked me why I broke your heart
You could've told me that you fell apart
But you walked past me
Like I wasn't there
And just pretended like you didn't care

I don't know why I run away
I'll make you cry when I run away

Take me back `cause I want to stay
Save your tears for another...
Save your tears for another day
Save your tears for another day

So I made you think that I would always stay
I said some things that I should never say
Yeah, I broke your heart like someone did to mine
And now you won't love me for a second time

I don't know why I run away, oh girl
Said I'll make you cry when I run away

Girl, take me back `cause I want to stay
Save your tears for another...
I realize that I'm much too late
And you deserve someone better
Save your tears for another day
Save your tears for another day

I'm trying to put you in the worst mood, ah
P1 cleaner than your church shoes, ah
Milli point two just to hurt you, ah
All red Lamb' just to tease you, ah
None of these toys on lease too, ah
Made your whole year in a week too, yah
Main bitch out your league too, ah
Side bitch out of your league too, ah

House so empty, need a centerpiece
20 racks a table cut from ebony
Cut that ivory into skinny pieces
Then she clean it with her face man I love my baby
You talking money, need a hearing aid
You talking bout me, I don't see the shade
Switch up my style, I take any lane
I switch up my cup, I kill any pain

Look what you've done
I'm a motherfuckin' starboy
Look what you've done
I'm a motherfuckin' starboy

Every day a nigga try to test me, ah
Every day a nigga try to end me, ah
Pull off in that Roadster SV, ah
Pockets overweight, gettin' hefty, ah
Coming for the king, that's a far cry, ah
I come alive in the fall time, I
the competition, I don't really listen
I'm in the blue Mulsanne bumping New Edition

House so empty, need a centerpiece
20 racks a table cut from ebony
Cut that ivory into skinny pieces
Then she clean it with her face man I love my baby
You talking money, need a hearing aid
You talking bout me, I don't see the shade
Switch up my style, I take any lane
I switch up my cup, I kill any pain

Look what you've done
I'm a motherfuckin' starboy
Look what you've done
I'm a motherfuckin' starboy

Let a nigga brag Pitt
Legend of the fall took the year like a bandit
Bought mama a crib and a brand new wagon
Now she hit the grocery shop looking lavish
Star Trek roof in that Wraith of Khan
Girls get loose when they hear this song
100 on the dash get me close to God
We don't pray for love, we just pray for cars

House so empty, need a centerpiece
20 racks a table cut from ebony
Cut that ivory into skinny pieces
Then she clean it with her face man I love my baby
You talking money, need a hearing aid
You talking bout me, I don't see the shade
Switch up my style, I take any lane
I switch up my cup, I kill any pain

Look what you've done
I'm a motherfuckin' starboy
Look what you've done
I'm a motherfuckin' starboy
Look what you've done
I'm a motherfuckin' starboy

The Weeknd – The Hills

Your man on the road, he doin' promo
You said, "Keep our business on the low-low"
I'm just tryna get you out the friend zone
'Cause you look even better than the photos
I can't find your house, send me the info
Drivin' through the gated residential
Found out I was comin', sent your friends home
Keep on tryna hide it but your friends know…

I only call you when it's half past five
The only time that I'll be by your side
I only love it when you touch me, not feel me
When I'm fucked up, that's the real me
When I'm fucked up, that's the real me, yeah…

I only call you when it's half past five
The only time I'd ever call you mine
I only love it when you touch me, not feel me
When I'm fucked up, that's the real me
When I'm fucked up, that's the real me, babe…

I'ma let you know and keep it simple
Tryna keep it up don't seem so simple
I just fucked two bitches 'fore I saw you
And you gon' have to do it at my tempo
Always tryna send me off to rehab
Drugs started feelin' like it's decaf
I'm just tryna live life for the moment
And all these motherfuckers wanna relapse…

I only call you when it's half past five
The only time that I'll be by your side
I only love it when you touch me, not feel me
When I'm fucked up, that's the real me
When I'm fucked up, that's the real me, yeah…

I only call you when it's half past five
The only time I'd ever call you mine
I only love it when you touch me, not feel me

When I’m fucked up, that’s the real me
When I’m fucked up, that’s the real me, babe…

Hills have eyes, the hills have eyes
Who are you to judge
Who are you to judge?
Hide your lies, girl, hide your lies
Only you to trust, only you…

I only call you when it’s half past five
The only time that I’ll be by your side
I only love it when you touch me, not feel me
When I’m fucked up, that’s the real me
When I’m fucked up, that’s the real me, yeah…

I only call you when it’s half past five
The only time I’d ever call you mine
I only love it when you touch me, not feel me
When I’m fucked up, that’s the real me
When I’m fucked up, that’s the real me, babe…

The Weeknd – What you need

I just want to take you there
He don't got to know where
Does he touch you here like this, this, this, this?
Let me take the friction from your lips (Ooh, woah)

And I'ma love you girl
The way you need
Ain't no one going to stop us
Ain't no one going to stop us
And I'ma give you girl
What you fiend
I'm the drug in your veins
Just fight through the pain

He's what you want, he's what you want
He's what you want, he's what you want
I'm what you need, what you need, what you need
I'm what you need, what you need, what you need

He's what you want, he's what you want
He's what you want, he's what you want
I'm what you need, what you need, what you need
I'm what you need, what you need, what you need

I got everything you want with me
I do everything he does times three
And he don't got to know
I got you on the floor
Doin' things you never thought you'd do
Baby, leave them high heel shoes
'Cause I love it when you're looking down at me
I'm looking up at you
And I don't give a damn shawty
Watch me knock your boots off

And I'ma love you girl
The way you need
Ain't no one going to stop us
Ain't no one going to stop us
And I'ma give you girl
What you fiend

I'm the drug in your veins
Just fight through the pain

He's what you want, he's what you want
He's what you want, he's what you want
I'm what you need, what you need, what you need
I'm what you need, what you need, what you need

He's what you want, he's what you want
He's what you want, he's what you want
I'm what you need, what you need, what you need
I'm what you need, what you need, what you need

ABSTRACT

This research investigates the assimilatory patterns of English observed in singing performances by four renowned singers: Adele, Ed Sheeran, Lana del Rey, and The Weeknd. The study aims to determine whether assimilatory patterns in singing differ from those in speech, shed light on the reasons behind the observed patterns, and identify any assimilation types not commonly found in speech. Through a qualitative analysis of spectrogram data, observation, and the use of PRAAT, the research examines instances of assimilation in the selected singers' performances and compares the patterns across North American and British accents.

The study's findings indicate that the tempo of songs influences the utilization of unique assimilatory patterns, with faster songs exhibiting a higher number of such patterns. Common assimilatory features across all accents include intervocalic flapping of /t/, /d/, and /ð/, realization of /t/ as a glottal stop, palatalization of /t/ before /r/, and assimilation of /d/ and /ð/ to preceding /n/ sounds. Accent-specific assimilatory patterns include assimilation of /ð/ to preceding /v/ for British English singers and applosiveness of utterance-final /t/ and /d/ for North American English singers.

The identified assimilatory patterns in singing can be attributed to the convenience of articulation, preservation of smooth vocalization, and optimization of air usage during performance. Notably, no assimilatory patterns exclusive to singing were found; all patterns complied with established speech norms. However, further research with a larger sample size and more diverse singers is recommended to validate the findings and explore potential gender-specific assimilatory patterns.

While this study contributes to the limited literature on the phonetic aspects of singing, the discretionary nature of assimilatory processes suggests that additional data and analysis are necessary to provide a comprehensive understanding of English pronunciation in singing performances.