A Sociophonetic Study of the Urban Bahamian Creole Vowel System

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Abstract

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Creole phonetics and phonology has long been a "Cinderella of creole studies" (Schneider, 2004a, 252) due to the discipline's traditional focus on traces of creole emergence as encoded in the varieties' morphosyntax. Accordingly, comprehensive accounts of creole vowels are hard to come by and the literature on American and Caribbean creole phonologies still lacks a detailed acoustic characterisation of the vowel inventories operating within the different regions – with the notable exception of Jamaica (e.g. Wassink, 1999a). The present study seeks to contribute to this area of research by providing an acoustic examination of the vowel system(s) of 33 Bahamian Creole (BahC) speakers from Nassau, the capital of the Bahamas, taking into account social aspects of synchronic variation.

The aim of this thesis was, thus, twofold. On the one hand, it presents a first in-depth acoustic description of the urban BahC vowel system, with a special focus on features relevant to phonological contrasts and major allophonic variation patterns. On the other hand, the effect of social (social class, gender) and stylistic factors was examined, and the distribution of socially diagnostic vocalic variables was compared to that of the morphological variable of past marking as previously analysed by Hackert (2004). All results were related to the historical development of BahC, a Caribbean creole language with North American roots, and to its position at the linguistic crossroads of the Americas.

Three types of data were analysed, representing three speech styles: Conversational data, map task data, that is interactional speech elicited with the help of labelled maps, and citation form data. All 33 participants were native black Bahamians and long-term residents of Nassau. The categorisation of speakers into different social classes was based on an occupational classification scheme developed by Gordon (1987) for the Jamaican context. In total, 10169 vowel tokens entered into the analyses of this study. Spectral (F1 and F2 at 10% intervals through the vowel) and temporal (from vowel onset to offset) measurements were conducted in Praat (Boersma and Weenik, 2009). All further analyses were performed in R (R Core Team, 2016), including vowel normalisation using the S-transform (see Fabricius et al., 2009), calculation of classification metrics based on Euclidean and Mahalanobis distances, and statistical testing via linear mixed-effects models. The main findings are as follows.

There was evidence for extensive allophonic variation of the vowels in FACE, GOAT, PRICE and MOUTH, conditioned by the voicing status of the following obstruent: Pre-voiceless diphthong glides were raised and peripheralised relative to their pre-voiced counterparts. For the vowels in FACE and GOAT, this general pattern led to exclusively monophthongal realisations in pre-voiced contexts and variably diphthongal realisations in pre-voiceless contexts. GOAT showed the greatest degree of diphthongisation for higher-class participants and in citation form speech; there were no analogous effects for FACE, where the degree of diphthongisation in pre-voiceless tokens correlated primarily with vowel duration. For the vowels in MOUTH and PRICE, pre-voiceless raising and peripheralisation affected not only the diphthong glides but also the nuclei; this resulted in a pattern of allophonic variation analogous to what has been referred to as Canadian Raising. For MOUTH, pre-voiceless raising was indexical of lower social class and correlated with more spontaneous, informal speech styles.

The vowel in NURSE was realised as a wide, back-to-front gliding diphthong or as a variably rhotic, mid-central monophthong. Diphthongal variants of NURSE, phonetically similar to but not merged with CHOICE, predominated in more informal speech styles and in the speech of working-class participants. In map task and citation form speech, rhotic realisations of (monophthongal) NURSE were quite common. This may indicate increasing rhoticisation of at least standard-near forms of urban Bahamian speech, which has previously been described as non-rhotic.

There was very limited evidence for social variation in the realisation of monophthongs. Though the vowel space of conversational urban BahC is best characterised

by a basic V-shape, low vowels showed some spectral differentiation in citation form speech: The vowels in START and PALM were raised and backed relative to TRAP. The vowels in START and LOT were phonetically distinct, as were the vowels in STRUT and LOT. High-front and high-back tense/lax vowel pairs were distinguished both spectrally and temporally.

In general, stylistic variation tended to be more stable and extensive than variation by social class. Differences between the vowel systems of the socio-stylistically defined polar varieties of the urban Bahamian speech continuum were mainly phonetic in nature rather than phonological. Significant variation conditioned by the speakers' gender was rare and did not consistently follow the pattern in Western speech communities whereby female speakers tend to use more standard forms than male speakers. When the distribution of stigmatised vocalic variables across the subset of speakers in the conversational dataset was compared to the distribution of the morphological variable of past inflection, it was found that they patterned in very similar ways; this indicates that they were likely also evaluated by speakers in very similar ways so that phonological variables have in principle the same potential to index creoleness or non-standardness as grammatical variables.

In terms of the Bahamas' position at the linguistic crossroads of the Americas, the results of this study showed that the urban BahC vowel system reflects a background in creolisation with a British English superstrate, but it is closer to American mainland varieties than to Caribbean varieties. The emerging Bahamian standard model of pronunciation incorporates features of both the British and the American standard and it combines them in a way that is uniquely Bahamian.

Chapter 1

Introduction

The Commonwealth of The Bahamas is a small group of islands southeast of Florida, inhabited by just over 350000 people and surrounded by the Atlantic Ocean. Despite its relatively small size and apparent insularity, the geographical location of the Bahamas and its varied sociopolitical, economic and cultural background has ensured its full involvement in the history of the Americas. As Bethel (2002) notes: "It is true that the sea cannot be easily crossed, except by those with the boats and skill. But it is equally true that with boats and skill the sea may be crossed in almost any direction one likes" (250). Prior to Columbus' arrival in San Salvador in 1492, the islands which now form part of the Bahamas were inhabited by seafaring Lucayan Indians. The Spanish enslaved and deported the indigenous population, but they made little attempt to settle the Bahamas due to the islands' lack of riches, poor soils and the treacherous surrounding waters – the name *Bahamas* is often said to come from Spanish *baja mar*, meaning 'shallow seas', though it more likely represents the Lucayan name originally given to San Salvador, *Guanahani* (Harper, 2016). The first English-speaking settlers arrived over 150 years later. In the wake of the American War of Independence, thousands of British loyalists fled the newly formed United States for the Bahamas, nearly tripling the local population and establishing settlements in previously uninhabited, remote locations. The language varieties used by blacks born in the Bahamas, by those that had arrived from North America, and by liberated slaves who hailed directly from Africa as shipments were intercepted in the final years of the transatlantic slave trade gradually merged into a local black Bahamian vernacular, referred to today as Bahamian Creole.

In the Bahamas, distinctions between what is global and what is local are not always very clear-cut. The Bahamas became an independent Commonwealth realm in 1973, retaining Queen Elizabeth II as its monarch. Its dependence on the United States for mostly economic reasons, however, only increased during the 20th century, as tourism and off-shore banking became the primary industries of the nation. Despite technically, that is geographically, not being a part of the Caribbean proper, the Bahamas also joined the Caribbean Community in 1983 (e.g. Craton and Saunders, 1992a,b). The diverse forces which shaped and still shape Bahamian society are reflected in its vernacular, an intermediate Caribbean English-lexifier creole with close ties to North American mainland varieties:

> Bahamian English seems American to the British, British to Americans, Caribbean to those not from the Caribbean proper, etc. [...] To Jamaican ears Bahamian English sounds very American [...], while black Americans and Bahamians refer to the more rustic features in one another's speech with exactly the same term: *Geechee*. (Holm and Shilling, 1982, 304-305)

Bahamian Creole represents a crossroads for many varieties of English, which makes it a particularly interesting research ground for sociolinguistic study. However, despite the Bahamas' interesting sociolinguistic landscape, Bahamian Creole has not received the same attention from researchers as has been bestowed on other, more 'radical' and, thus, long considered more typical creole languages of the Caribbean region, such as the creoles spoken in Jamaica or Guyana. This is especially true regarding aspects of phonetics and phonology, which are a "Cinderella of creole studies" (Schneider, 2004a, 252) in general. In part, the lack of research on creole phonology may be due to the discipline's traditional focus on questions of creole language genesis, and to the fact that morphology and syntax often provide the most direct links to cognitive science, which has influenced the field immensely (e.g. Aceto, 2004, 481-482). It is also the case, however, that sound segments, and especially the realisation of vowels, are characterised by a high degree of variability, which complicates the reliable and objective documentation of features in the absence of high-quality but affordable recording and processing devices. In more recent years, and no doubt enabled by the increased availability of said recording and processing devices, interest in the research community in the nature of and variation within creole systems of pronunciation has surfaced, but, so far, the literature on North American and Caribbean creole phonologies still lacks a detailed acoustic characterisation of the vowel inventories operating within the different regions – with the notable exception of Jamaica (e.g. Wassink, 1999a, 2001). The present study explicitly contributes to this area of research by providing a sociophonetic description of the vowel system(s) operating within the urban Bahamian Creole continuum. In this context, 'urban' refers to the mesolectal-to-acrolectal forms of BahC spoken in Nassau, the nation's capital city, situated on the island of New Providence. As presently about 70% of all Bahamians live in Nassau, the urban variety may be considered most representative of Bahamian Creole at large.

The aim of this thesis is twofold. On the one hand, this study seeks to further our understanding of the internal linguistic structure of urban Bahamian speech as reflected in its vowel system. The speakers speech productions will be investigated with recourse to methods from acoustic phonetics, examining the spectral and temporal features of vowels with the intention of describing features relevant to phonological contrasts or major allophonic variation and providing material that will help clarify the position of Bahamian varieties relative to related or associated language varieties spoken in North America and the Caribbean. On the other hand, it is concerned with the social countenance of synchronic variation in the urban Bahamian creole speech community regarding the effect of both social and stylistic factors. This study combines the analysis of internal structure and external influences on language use in a creole environment with attention to phonetic detail and is, as such, positioned at the intersection of sociolinguistics, creolistics, and acoustic phonetics.

The theoretical background for the present study is provided in chapter 2. First, certain preliminaries are taken up briefly in section 2.1, where terminological issues and the classification of language varieties into (more or less) creolised varieties are discussed. The study of language use in the urban Bahamian speech community cannot be divorced from questions of the society's sociohistory and the emergence of its national identity. These aspects are outlined in section 2.2, focussing specifically on social developments that have likely had an impact on the linguistic landscape of the Bahamas today. Section 2.3 then turns to a discussion of the sociolinguistic background of this study, introducing how linguistic variation in creole speech communities has been modelled and presenting findings of previous sociolinguistic research on varieties spoken in the Caribbean and the Bahamas. Section 2.4 is concerned with creole phonology. It summarises what is known about the phonologies and vowel systems of Caribbean creoles collectively, followed by a brief outline of how vowels can be analysed acoustically. Previous research on Caribbean varieties in the sociophonetic paradigm is discussed and the Bahamian Creole vowel system is introduced. A clear statement of overarching research questions concludes this chapter.

Chapter 3 is concerned with methodology. It presents, first, my fieldwork methods and describes the data collected. Subsequently, the general analysis procedure is outlined.

The empirical analysis is spread across two chapters, one devoted to diphthongs (chapter 4), further divided into three sections in order to focus on three pairs of diphthongs individually, and the other to monophthongs (chapter 5). Each analysis section comprises a short background section, an outline of the analysis procedure, a results section, and a brief summary.

Chapter 6 provides the general discussion, reviewing all the findings of the preceding analysis sections and relating them to the main research questions. Concluding remarks are found in chapter 7.

Chapter 2

English, creole and the Bahamas

It is curious that the most basic concepts of linguistics are often notoriously difficult to define in a clear and concise manner. The meanings of labels such as *language*, *dialect*, and *creole* are often treated as useful building blocks in the construction of more elaborate theories, but every definition, be it explicit or implicit, reflects a certain perspective geared to satisfy the research context and, thus, fails to account for the endless amount of variety supplied by reality. Section 2.1 below provides a working definition of the concept of creole languages with special focus on English-lexifier varieties in the North American and Caribbean context. The aim is not to enter into an exhaustive discussion of the various approaches that have been proposed to define creoles and other contact-induced varieties, but to outline as briefly and objectively as possible the theoretical background some of the more wide-spread frameworks provide for this study. For more detailed treatments see, for example, Holm (2004) or, in the broader context of contact linguistics, Winford (2007). Section 2.1 will also introduce the notion of Bahamian Creole and discuss how it is presumed to relate to associated varieties, based on a number of classification schemes. In section 2.2, the major milestones of the sociohistory of the Bahamas will be outlined in order to illustrate and substantiate the claims concerning its unique position at the linguistic crossroads of the Americas. Section 2.3 will look at how synchronic variation has been modelled in creole speech communities and provide the sociolinguistic background for the present study. In section 2.4, some general issues concerning research on Caribbean creole phonologies and vowel systems will be presented, before the focus will shift to previous acoustic studies on Caribbean creole vowels and the Bahamian Creole vowel system. Section 2.5 provides a clear statement of the overarching research questions addressed in this study.

2.1 Terminological issues

2.1.1 Creole languages

Creoles are considered to result from linguistic processes that represent "extreme examples of contact-induced language change" (Holm, 2004, 3). They are languages that developed as a means of verbal communication in situations of extended contact between groups of speakers who did not share a common or mutually intelligible language. Usually, the group or groups with less socio-political power, speakers of so-called *substrate* languages, are more accommodating and make use of the words provided by the language spoken by the more powerful group, referred to as the *superstrate* or *lexifier* language. Crucially, however, the social matrix at the time of contact inhibits sufficient access to the input languages for any group to fully acquire the native language of any other group. It has been suggested that a prerequisite for this development is *tertiary hybridisation*, whereby the emerging creole is used and formed mainly by substrate speakers in the absence of superstrate speakers (see e.g. Holm, 2004; Winford, 2007; Velupillai, 2015).

In contrast to pidgins, which are often described as contact-induced "make-shift language[s]" (Holm, 2004, 5), creoles are full-fledged natural languages that are spoken natively by an entire speech community. Creoles have traditionally been defined as nativised pidgins, which, in the process of creolisation, have undergone structural expansion and elaboration to meet the same expressive potential as any other, non-creole language. There is, however, not necessarily a great difference between creoles and pidgins in terms of the nature and speed of development as well as synchronic structural complexity. Moreover, a distinction based on the criterion of nativisation may be difficult to uphold in speech communities, where the same contact language is used as both a first and a second language by different speaker groups (e.g. Winford, 2007, 306-307).

The exact definition of creole language remains a matter of intense debate, as it is difficult to find a common denominator for all varieties conventionally subsumed under this obscure category which unambiguously sets them apart from non-creole languages. It is occasionally pointed out that creole languages are relatively new languages, which only emerged between 150 and 400 years ago (e.g. Aceto, 2006, 206). As it is highly unlikely that contact-derived varieties are an exclusively modern phenomenon, this would indicate that the apparent status of a language as a creole language has a natural expiry date and that, over time, processes of language change may confound the specific circumstances involved in their emergence. Some linguists have argued that, due to their young age, creoles lack the "weight of 'ornament' that encrusts older languages" (McWhorter, 2001, 125) and can, thus, be identified synchronically as a distinct typological group based on their relatively low structural complexity (e.g. McWhorter, 2001; Parkvall, 2008). Bakker et al. (2011) provide empirical evidence which suggests that creoles may also be distinguished from non-creoles on the basis of structural-typological features not differentiable with regard to complexity, but the notion of creoles as a distinct typological class remains a fiercely contended issue (see e.g. discussions in McWhorter, 2008; Kouwenberg, 2010a,b; DeGraff et al., 2013; Bakker, 2014).

Those that argue there is not enough evidence for the view of creoles as a distinct, structurally defined class prefer to define creoles based on their sociohistorical context of emergence. While the exact sociohistory of any given language is unique, including any given creole language, it is widely acknowledged that the contact situations in which creoles have evolved share certain sociolinguistic parameters (e.g. Holm, 2004; Aceto, 2006; Winford, 2007). Specifically, it is assumed that these contact situations were characterised by a "lopsided power dynamic" (Aceto, 2006, 204), in which the socially subordinate substrate speakers would be motivated to attempt to approximate the prestigious superstrate language, and by maintained social distance between the groups involved, limiting the substrate speakers' access to the superstrate. The plantation scenario surrounding the genesis of creoles in colonial America is usually cited as the prototypical context of creole formation, because the demographics and codes of social interaction at the time of contact are deemed especially conducive to the emergence of these languages. European colonisation and the institution of slavery put in place a disproportionate power relationship and a rigid social order. With the establishment of large-scale plantation economies, the demographic ratio between substrate and superstrate speakers increased drastically. The access of the field slaves to language varieties of the colonial powers must have been severely restricted and the relative proficiency in the European target language was likely in direct relation to the speaker's social position. The slave population, which had been forcefully uprooted from diverse regions in West and West-Central Africa and transported to another continent, did not necessarily share a common language, which may have served as a catalyst in the stabilisation of a new contact vernacular via tertiary hybridisation.

The recurring attempts to define what a creole is from either a structural or a sociohistorical vantage point have been criticised for theoretical and practical reasons. Some linguists question the meaningfulness of such a pursuit on principle, suggesting that it reflects expectations that are grounded in traditional dogma, ethnocentricity and/or insufficient familiarity with the diversity encountered in creole languages. Ansaldo and Matthews (2007), for instance, claim that what sets creoles apart from non-creoles is not the identity of supposed creole languages themselves but rather "the way in which at least some creolists have approached the study of language" (3). They consequently argue for a reintegration of creole studies into mainstream linguistic investigation, dissolving the notion of creoles as a unique or exceptional type of language altogether and treating them as "products of high-contact environments in specific sociohistorical settings" (4). It would seem, then, that the question is: When are specific social settings and resulting sociolinguistic processes specific enough to warrant a special designation? Against the backdrop of the paradigm of Postcolonial Englishes (or: New Englishes, World Englishes) and in the broader context of contact linguistics, restating the question of what it means when a given language is classified as a creole has brought into focus the theoretical importance of gradience in creolisation (e.g. Neumann-Holzschuh and Schneider, 2000a; Schneider, 2007; Winford, 2007). Even among the subset of Atlantic English-lexifier creoles in the Americas, whose genesis conditions shared certain linguistic and sociohistorical aspects, some creoles show a higher degree of restructuring relative to their lexifier than others. This perceived cline in creoleness had previously been attributed to *decreolisation*, a process whereby creole languages gradually lose their supposed creole features as a consequence of increased and sustained contact with their lexifier. More recently, it has been recognised that evidence does not support the assumption that all less heavily restructured varieties were once more creole-like, whatever such a characterisation may entail, and that differentiation could occur at the onset of creole formation (e.g. Neumann-Holzschuh and Schneider, 2000b, 1-2).

In an attempt to provide labels for Caribbean language varieties which take into account differences in the sociolinguistic histories presumably underlying observed synchronic structural differences, Aceto (2003) distinguishes between *Autonomous or Deep Creole Varieties* and *Dialect Creole Varieties* [1]. Autonomous or Deep Creole Varieties represent those cases, in which access to the lexifier was historically severely restricted and superstrate speakers were "submerged within a significant 'sea' of speakers of other first language varieties" (139). The varieties that emerged such as Gullah, spoken in the Low Country regions of South Carolina and Georgia, or the Surinamese creoles were structurally very different from their lexifiers and largely unintelligible to speakers of dialectal lexifier varieties. Dialectal Creole Varieties such as Cayman Islands English and African American Vernacular English (AAVE) represent the inverse case: Access to the lexifier was consistently more available and the "'sea' of first language or substrate speakers [...] was never as 'deep', substantial or sustained" (137). The resulting varieties were structurally much closer to their respective lexifiers and some may be more appropriately viewed as dialectal than as creole varieties. Aceto's classification is notable in that he views creolisation as a primarily social process and categorises creole varieties accordingly. Any structural consequences are merely cited as the most likely linguistic outcome of a given scenario. The notion of only partially creolised varieties, however, often referred to as *semi-creoles*, is not a new concept but dates back to (at least) the late 19th century. Semi-creoles are usually defined in terms of their structural characteristics as varieties which display only a limited number of presumed creole features. The sociolinguistic contexts of their emergence are quite diverse, ranging from varieties that never fully creolised to non-creoles taking on creole features (Holm, 2000, 20-22). Despite the opposite perspectives constituted by the labels Dialect Creole Varieties and semi-creoles, if a causal relationship between sociohistorical events and degree of creolisation can indeed be assumed, a large amount of overlap in varieties subsumed under these categories is to be expected.

Winford (2007, 254-256) proposes to go beyond the narrow focus on creole languages and to integrate creoles in a model which directly relates them to other contact-induced varieties (see figure 2.1). The emergence of creoles versus indigenised varieties of a given superstrate language such as English are represented as

[1] Aceto (2003) additionally includes the category of *Immigrant Creole Varieties*, which differ from the others in that they are usually a post-emancipation phenomenon, caused by extensive intra-Caribbean migration. They derive from the mixing of pre-existing, fully-formed English-derived creole and/or dialect varieties and no a priori claim can be made concerning their structural distance from their lexifiers.

processes occupying different points on a cline, ranging from heavily restructured varieties to native-like varieties resulting from fairly successful group second language acquisition. The underlying assumption is, of course, that there is no categorical difference between creoles, dialects and other outcomes of language shift. The main criteria for locating varieties on Winford's scale are structural in nature, but he emphasises that there is no "set of structural characteristics that is definitive of creole status" (255). He argues that transfer from the first or substrate language and simplification are not unique to creolised varieties but stem from processes of change and restructuring which creolisation shares with other products of language contact involving natural second language acquisition. The structural difference between creolisation and indigenisation is, thus, considered a question of quantity, not of quality. By implication, membership in the category of creole languages has to be understood as inherently scalar (see also discussion in Schneider, 2007, 60-64). Within the category of creole languages, Winford (2007, 313-319) distinguishes *radical creoles* from lighter, less heavily restructured *intermediate creoles*. While the difference between these two subcategories is also gradual, he argues that radical and intermediate creoles should each be analysed as creations in their own right, independently of one another, because they presumably emerged in qualitatively different language ecologies.

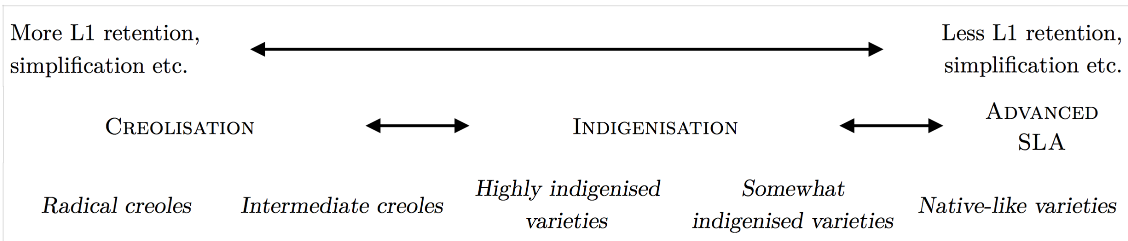

Figure 2.1: From Creolisation to Advanced Second Language Acquisition: Continuum of outcomes of group language shift, adapted from Winford (2007, 256)

From the above outline of various approaches to the concept of creole, the following working definition for English-derived creole varieties in the North American context may be derived. Creoles are contact-induced, natural languages that developed in the context of plantation society as a means of primarily intra-ethnic communication among the slave population. Depending on the sociolinguistic environment at the onset and during creole formation, in particular with respect to demographic proportions and social patterns of interaction which governed access to the lexifier, English was (or, rather English dialects were) gradually restructured into more or less divergent linguistic systems. The equation for contact-induced restructuring is principally the same for both indigenised and creolised varieties. The latter, however, represent varieties in which early speakers were to some extent deprived of lexifier input, so that the influence of diverse African substrate languages and universal principles of group second language acquisition was more pronounced.

2.1.2 Bahamian Creole

The Commonwealth of The Bahamas, situated in the southern Atlantic Ocean, consists of a string of more than 700 islands extending from southeastern Florida in the north to Cuba and Hispaniola in the south (see figure 2.2). The capital city Nassau is on the island of New Providence. Freeport, the second largest city is situated on Grand Bahama, a mere 50 miles from the coast of Florida. Islands in the archipelago other than New Providence and Grand Bahama are known as the *Family Islands* or, formerly, as the *Out Islands*. Despite its geographical proximity to the North American mainland and its strong sociohistorical ties to the United States, the Bahamas are frequently associated with the islands of the Caribbean, politically as well as culturally and linguistically. *Bahamian Creole* (BahC) is the mother tongue of the majority of black Bahamians, who constitute about 90% of the total population of 351461 as of 2010 (Department of Statistics of The Bahamas, 2012). The official language of the Bahamas, however, is English and the roles that standard English and BahC play in Bahamian society must be seen in the broader context of the development of other Caribbean countries from British colonial societies, dominated by slave economies, into independent nations strongly influenced by North American culture.

With respect to the gradience in creolisation discussed above, BahC is usually grouped with the less heavily restructured varieties, though estimates concerning its exact position relative to associated varieties vary. Aceto (2003) considers BahC a Dialectal Creole Variety, comparable in character to African American Vernacular English (AAVE) rather than to Deep Creole Varieties such as Jamaican Creole (JamC) and North American Gullah. Holm (2004), who distinguishes creoles from semi-creoles, identifies AAVE as a semi-creole but places BahC firmly within the

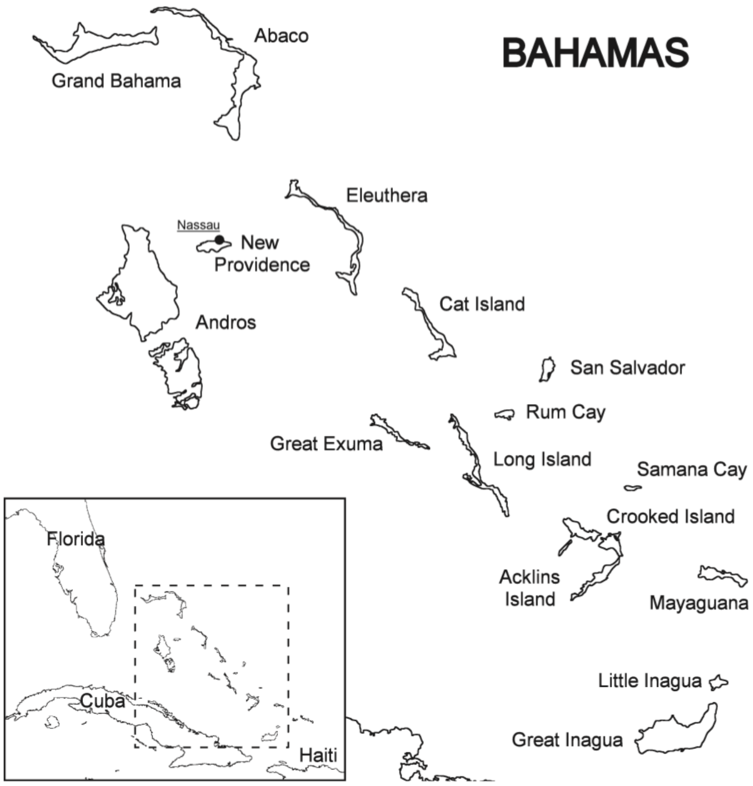

Figure 2.2: The Bahamas (Hackert and Huber, 2007, 281)

category of full-fledged creoles, whose varying degrees of restructuring are not further differentiated. Winford (1993, 2007) divides creoles into more or less radically restructured varieties. According to this scheme, BahC is considered an intermediate creole en par with varieties such as Bajan, the creole spoken on Barbados, and Trinidadian; they are presumed closer to their lexifier than more radical creoles such as JamC and Tobagonian, but farther removed than indigenised, dialectal varieties such as AAVE. The grounds on which BahC has been categorised in each of these models are largely abstract and impressionistic, a fact that may have contributed to the apparent lack of agreement. More importantly, however, there is extensive variability within each of the listed creole languages, ranging from more extreme, basilectal forms to standard-near acrolects, and it is not always clear which form a given author used as the basis of comparison. For the Bahamian context, Lawlor (1996) argues that differences in island settlement patterns and socioeconomic development, variably reinforced by the relative isolation of settlements, gave rise to "discrete [linguistic] systems" ranging from "a creole system in the southeast islands to an English dialect in the northeast islands with speech varieties in New Providence intermediate to these two extremes" (10). Aside from all-white northern communities and the southeastern islands predominantly settled by black Bahamians, most parts of the Bahamas have seen considerable inter-ethnic and linguistic contact over the past three centuries. This situation is reflected in the present state of mesolectal BahC, which Holm (1980) summarises as follows: "[I]t is closer to white English than comparable varieties in the Caribbean proper, but much farther from white English than the vernacular Black English of the United States." (55) With recourse to Winford's (2007) continuum model of contact vernaculars, BahC as spoken by the majority of black Bahamians may thus be adequately referred to as an intermediate creole.

There appear to be some satisfactory reasons for dividing the region of the Caribbean linguistically into geographically defined varieties. Winford (1993, 3-5) distinguishes eastern varieties such as those spoken in Trinidad and Tobago, Barbados and Guyana from western varieties such as JamC and Cayman Island English, grouping BahC with the latter. This distinction is based on a relatively small selection of phonological and morphosyntactic features and it is emphasised that similarities among all anglophone Caribbean varieties far outweigh their differences. Indeed, Winford (1993) conceives of the eastern and western varieties as branches subsumed under the higher node of Caribbean English Creole, which he suggests may have initially been "essentially a uniform language" (374) that gradually diversified under the pressure of regionally varying social conditions. It remains unclear how such a family of Caribbean creole languages might relate to North American varieties such as AAVE and Gullah. Holm (2004, 92) takes a broader perspective and distinguishes several groups of English-lexifier New World creoles on the basis of mainly sociohistorical criteria. Caribbean creoles are once again divided into eastern and western varieties, corresponding closely to the distinction proposed by Winford (2007). The only difference concerns the position of BahC, which Holm (2004) groups with the North American creole varieties due to its close relationship with Gullah.

2.2 A short sociohistory of the Bahamas

The historical and linguistic connection between BahC and American mainland varieties AAVE and Gullah have long been a matter of dispute. The intertwining histories of the Bahamas and today's United States can be documented as far back as 1670, when Charles II granted a patent to the Lords Proprietors of Carolina which included the Bahamian islands, effectively uniting the territories to form a joint colony that would endure for about 50 years. The first permanent British settlement on the Bahamas had been established on the northern island of Eleuthera in 1648 by a few dozen religious dissenters from Bermuda. It is assumed that servants and slaves formed part of arriving shipments from the very beginning. By 1670, Bahamian settlements had spread to the island of New Providence and the total population had reached at least 500. About two-thirds of the early settlers were white, clearly outnumbering the black [2]. The harsh living conditions on the islands required close cooperation by all inhabitants, who turned to the sea for a living or worked on small farms, fostering sustained contact between the ethnic groups. During this early period of colonisation, thus, blacks in the Bahamas must have had sufficient access to the white settlers' dialects to learn English under conditions of normal second language acquisition (e.g. Hackert, 2004, 34-36). After an interlude of piratical chaos at the beginning of the 18th century, the Lords Proprietors were replaced by separate governors for the Bahamas and Carolina, but the colonies remained in close political and economic contact. The population of the Bahamas gradually increased (see figure 2.3), until in 1773, on the eve of the American revolution, it amounted to 4293, of which about 66% lived on New Providence. As the total number of settlers increased, so did the proportion of blacks. It had grown to an average of 54% and was greatest in New Providence, where 64% of the inhabitants were now black (e.g. Hackert, 2004, 37). The concomitant decline in the originally intense contact between blacks and whites must have progressively restricted access to the superstrate dialects, but it is unlikely that a wide-spread, full-fledged creole had formed in the Bahamas at that time.

The massive influx of American loyalists and their slaves, fleeing the newly established United States after the Revolutionary War, had a profound demographic effect on the still small Bahamian population, as can be gleaned from figure 2.3. It

[2]The indigenous Lucayan population had been enslaved and deported by the Spanish about a century prior to British settlement.

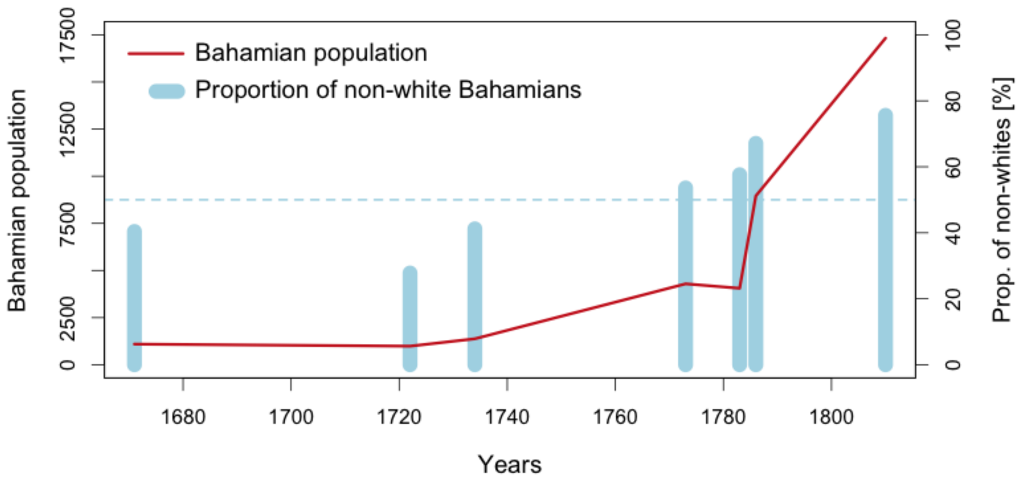

Figure 2.3: Estimated growth of the Bahamian population and of the relative proportion of black and coloured Bahamians during the 18th century; see Hackert and Huber (2007, 281-282) and Craton and Saunders (1992a, 261)

is these emigrants who are credited with importing creole into the Bahamas. On the whole, about 1600 white loyalists and 5700 slaves and free blacks are estimated to have left the American mainland for the Bahamas. This would have almost tripled the Bahamian population. It also raised the average proportion of blacks to over 70% and increased the number of permanently settled islands as many loyalist planters took their families and slaves to the heretofore largely unpopulated Bahamian south in the hope to set up prosperous cotton plantations (e.g. Hackert, 2004, 37). Based on mainly lexical and some syntactic similarities between contemporary BahC and Gullah, Holm (1983) hypothesised that the majority of black emigrants must have spoken an earlier, creolised form of AAVE, which consequently blended with the Bahamian vernacular that had developed on the northern islands and predominated over speech patterns in the south. Gullah was seen as either the remnant or immediate descendent of this once more wide-spread American Plantation Creole and BahC was regarded a diaspora variety of the latter. Evidence has meanwhile accumulated which suggests that AAVE was never itself a creole language and that, while there may have been some independent "[p]ockets of greater restructuring" (Hackert and Holm, 2009, 16), the demographic and social conditions in the majority of locales in the colonial American South were not conducive to full creolisation. Hackert and Holm (2009) and Hackert and Huber (2007) argue that the creole nature of the Bahamian vernacular instead derives directly from its close relationship with Gullah, which is not mediated by a third, deceased or fading creole language. A close analysis of historical records enabled the distinction between ports of embarkation and the loyalists' actual points of origin, which revealed that a substantial amount of black emigrants must have hailed form Gullah-speaking areas in low-country South Carolina and Georgia. Hackert and Huber (2007) additionally provide linguistic evidence which supports the assumption of a particularly close connection between BahC and Gullah: Based on an analysis of the relative amount of lexical and structural features shared between BahC, Gullah, and six other Atlantic English-lexifier creoles in early textual material, they show that the linguistic affinity between BahC and Gullah is stronger than the affinities between BahC and any other of the tested creoles, including fellow Caribbean varieties JamC and Bajan. Consequently, Hackert and Huber (2007) conclude that the combined historical and linguistic data indicate that "Gullah and BahCE are indeed closely related – so closely in fact that BahCE must be considered a diaspora variety not of AAVE but of Gullah." (280)

The further development of the imported creole throughout the 19th century would have depended chiefly on the amount of contact and the type of social relations between the ethnic groups on the diverse islands of the Bahamas. The plantation system on the Bahamas is said to have been of modest proportions compared to that of other Caribbean territories and the southern United States. Only about a quarter of Bahamian slaves worked on farms holding more than 50 slave labourers, and these were concentrated on the southeastern islands, stretching from Cat Island and Great Exuma to the Inaguas, which had been largely unsettled before the loyalists' arrival. The demographic distribution of whites and non-whites at the time reflects the relative size of slave holdings. Figure 2.3 shows that by 1810, about 75% of the Bahamian population were coloured or black, but their distribution across the islands was far from homogenous. On northern islands such as Eleuthera and Abaco, the mean proportion of non-whites amounted to about 50%, while on the southeastern islands, the proportion of non-whites averaged at about 95%. About 70% of New Providence inhabitants were recorded as coloured or black, but the majority of slave holdings on this island were comparatively small and by 1834 almost half of the slave population worked as domestics (Craton and Saunders, 1992a, 261, 281, 286). The cotton plantation in the southern Bahamas soon failed due to the poor soil of the islands and by 1820 most planters had left their estates, leaving behind their former slaves to fend for themselves in subsistence farming, fishing or salt raking. Domestics and slaves working on small farms must have had more sustained contact with English-speaking whites, but harsh vagrancy laws and segregation policies severely restricted social interaction between the races. The linguistic situation of blacks in the Bahamas must have been as diverse as their living conditions, but, in general, access to English drastically declined following the arrival of the loyalists. As Hackert (2004) concludes,

> although a creole variety [...] can be presumed to have flourished in the southern Bahamas as well as in parts of New Providence (and possibly on other northern islands), the assumption of a supraregionally uniform creole is probably as little warranted for the Bahamas after the Loyalist immigration as it would be for the American South of the same time. (Hackert, 2004, 44)

After the abolition of slavery, enacted in 1833 and gradually achieved the following years, the black Bahamian population consisted of families who had been free for generations, recently freed slaves and about 25% African-born blacks, who had been liberated after Britain outlawed international slave trade in 1807. The isolation, poverty, and hardships of island life, coupled with the social separation between blacks and whites, contributed to the emergence of an African-Bahamian identity as the black population gradually drew together. After the American Civil War, many Bahamians sought to garner a better life for themselves and their families and migrated to the United States, mainly to Key West and southern Florida. In 1920, at the height of what is popularly known as the *Miami Craze*, it is estimated that almost 5000 Bahamian-born blacks had permanently moved to Miami; they constituted more than half of the city's black and about 16% of its total population (Craton and Saunders, 1992b). While some moved on to industrialised cities in the north, most retained close family ties to their homeland and even today cherish their identity as Bahamian Americans. Mohl (1987, 217-222) sees the Bahamian immigration to Florida in the early 20th century as only one aspect of a larger pattern of Caribbean migration. Many Caribbean island nations suffered periodically from ecological disasters and severe shortage of employment and basic food supply, so that "migration became a form of economic adaption, an essential strategy that enabled Caribbean people to survive despite their depleted and insufficiently productive lands" (275-276). Prior to the vast Bahamian migration to Florida, Bahamians had already been working all over Central America, mostly in short-term positions as stevedores and deck hands on steam ships engaged in fruit and lumber trade or alongside fellow Caribbean workers as contract labourers on plantations and larger construction projects. As early as 1905, British officials already questioned the long-term benefit, if any, such large-scale labour migration might have on the Bahamian economy and, apparently, would have preferred to maintain sociocultural hegemony and population stability in their colony (Mohl, 1987, 277-279). But it was not to be, and the irreversible trend towards American economy and culture continued to undermine British imperialism. During World War I, thousands of Bahamians served as soldiers of the British West India regiment. Far fewer went overseas to fight for the British Empire in World War II, though Bahamians were still nominally involved and New Providence served as an important training base for British soldiers in the Royal Air Force (Craton and Saunders, 1992b, 275-277). As a result of the exigencies of the war, the United States government arranged for the temporary employment of migrant labourers in especially the agricultural sector, of which a substantial amount was provided by the Bahamas. Under *The Contract*, as the labour programme is sometimes referred to, an estimated 30000 Bahamians were recruited to work in over 20 states between the years 1943 and 1965. Scholars have suggested that *The Contract* left a significant mark upon Bahamian society. The wages earned enabled many families to save money and to lay the foundations of financially more secure lives (Thompson, 2012). Bethel (2002, 245-246) claims that the experience of strict racial segregation in the US also strongly influenced the self-construction of identity of non-white Bahamians in that the racial distinction between black and white tends to be more rigid in Bahamian society today than in other Caribbean countries.

Throughout the 20th century, a successful economy based on tourism and foreign investment was gradually built up, but the majority of black Bahamians still lived in dismal circumstances and, in the early 1950s, were still denied basic rights of citizenship. Despite the pervasive culture of white supremacy, a black middle class had slowly emerged and aspired for representation in the House of Assembly, which was still under British rule and dominated by the white bourgeoisie. In 1953, the Progressive Liberal Party was formed with the main goal to win power for the black majority. This aim was finally achieved in 1967 and on July 10, 1973, the Bahamas became fully independent within the Commonwealth of Nations, retaining the British monarch as head of state. The new government under the first black Prime Minister of the Bahamas, Sir Lynden Pindling, continued to support economic policies based on tourism and banking. They also significantly increased educational spending, which would in time increase access to social mobility for the black population and contribute to the diversification of the Bahamian middle class (Hackert, 2004, 46-48).

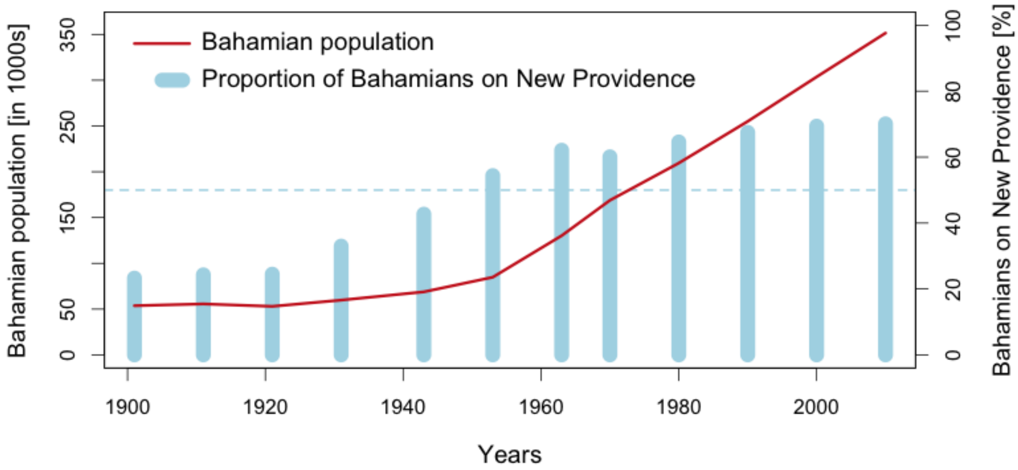

Figure 2.4: Census data (Department of Statistics of The Bahamas, 2012, 1-2) on the growth of the Bahamian population and of the relative proportion of Bahamians living on New Providence throughout the 20th century up to 2010

Two related demographic processes, illustrated in figure 2.4, showed to have considerable impact on Bahamian society in the second half of the 20th century: population explosion and urbanisation. Starting in the years following World War II, the Bahamian population drastically increased from 84841 in 1953 to more than four times the size in 2010, when census data recorded a total population of 351461. According to the 99% who responded to the race question in 2010, 91% identified themselves as being black, 5% as white and 2% as mixed black and white. The massive growth in population was accompanied by a progressive relocation of large parts of the Bahamian population away from the more rural Family Islands to the urbanised centres on New Providence and Grand Bahama. At the beginning of the 20th century, about 23% of the Bahamian population lived on New Providence. By 1953, the number had increased to more than half of the population. As of 2010, 70% of all Bahamians live on New Providence and another 15% are recorded for Grand Bahama. Together with Abaco, Eleuthera and Andros, these northern islands now account for 94% of the total population of the Bahamas and, as one moves south, the islands tend to be less and less populated (Department of Statistics of The Bahamas, 2012, 1-2, 10, 82). Urbanisation has obviously caused a change in lifestyle and has brought with it a number of problems. While the majority of Bahamian now live in Nassau, most of them can trace their family to or originate themselves from elsewhere in the archipelago and these island origins are crucial in the maintenance of personal identities. Hackert (2004) notes that many of her Nassauvian interviewees contrasted the anonymity of modern city life, with its materialistic outlook and corruptive potential, to the simple island life of days gone by, where daily pursuits were centred around family and neighbours and villagers lived together in harmony. While some of these notions may reflect a certain amount of nostalgia and were likely "reinforced by the naiveté of childhood and youth" (48-49), Nassau is also objectively not without its problems. It has come to play a pivotal role in the transshipment of illicit drugs, mainly cocaine and marijuana, from source countries in the Caribbean, South and Central America to the United States via the Florida coast (see e.g. Bullington, 1991). A high rate of unemployment has lead to the increased ghettoisation of certain residential areas such as *Over-the-hill* and to a rise in violent crime, mostly related to the consumption and trafficking of narcotics (Hackert, 2004, 49).

In linguistic terms, the social developments since Bahamian independence have drastically increased access to English for the black Bahamian population, via education and media but also in the day-to-day interactions with tourists, so that most Bahamians today can comfortably switch from BahC to more standard-near forms of English if so required by the social context. As in other former British colonies, British English originally functioned as the primary exonormative standard. In the last decades, however, influence of American language and culture has encroached on many aspects of Bahamian society. When the Bahamian educational system was reorganised in 1973, the Ministry of Education & Culture (1972) officially rejected the old colonial system, which was considered "narrow, meager, ill-suited and irrelevant" (2), in favour of a national system, which would "embrace a philosophy which is characteristic of the nation's ideals, values, beliefs and customs" (2). A deliberate policy of "Bahamianisation" was adopted, which demanded that "the teaching force be Bahamianised as soon as it is consistent with sound educational progress" (15). Expatriate educators, mostly British, were gradually replaced by qualified Bahamian nationals. US-based publishing houses have become the suppliers of most textbooks in the Bahamas, especially in the context of primary and tertiary education. From the late 1960s to the present, North American universities have dominated as providers of higher education to Bahamians. Between 1980 and 1998, an annual average of about 147 government scholarships were awarded to Bahamian students to study abroad, and of the total about 84% went to study at universities in Canada or the United States. Even though the Bahamian government has been a financial contributor to the University of the West Indies since 1964 and established a local university, the College of The Bahamas, in 1975, the numbers of Bahamians studying abroad is growing steadily (Urwick, 2002, 161-163, 164). American cultural and linguistic influence is also disseminated through the mass media. According to a public survey conducted among inhabitants of 300 households on New Providence in 2008, nine of the top ten most watched television channels are based in the United States. The two most popular newspapers were *The Tribune* and *The Guardian*, both based in Nassau, but almost 20% indicated they also regularly read the *Miami Herald* (Ministry of Tourism & Aviation, 2008, 34-37). The most important industry in the Bahamas today is the tourism industry, which, from its very beginning, was dominated by North American tourists. In addition to about 3.8 million cruise passengers, 1.4 million stay-over arrivals were recorded for the Bahamas as a whole in 2010, of which about 80% came from the United States and another 9% from Canada. As with many aspects of Bahamian society, Nassau/New Providence is the centre of the tourism business and in 2010 accounted for over 66% of all stay-over arrivals (Caribbean Tourism Organization, 2010, 13-16). In the 2008 public survey mentioned above, 52% of the participants stated that they worked directly in the tourism industry. About half of the residents in New Providence would, consequently, have regular and close contact with speakers of American English, but this estimate is likely to be somewhat conservative, as over 60% thought their job was related to tourism and only 18% believed that tourism did not affect them personally (Ministry of Tourism & Aviation, 2008, 21, 23, 31).

Thus, while from a diachronic perspective Bahamian speech, like other English-derived Caribbean varieties, is more British-oriented, political independence and the self-awareness that goes with can be expected to have had an impact on attitudes towards standard usage of any kind. Today, British and American English are in competition as the providers of exonormative models of standard English to the Commonwealth Caribbean (e.g. Aceto, 2006, 211). According to McArthur (2002), the "degree of acceptability of Standard British English [...] continues to depend on sensitivities dating from colonial experience, and the degree of comfort with Standard American English depends on whether [...] the US is perceived as primarily benevolent or malevolent" (231). Although there may be pressure towards the unequivocal adoption of one of the two international standard varieties, he argued that it may be more realistic to view the two standards as running "side by side [...] while providing a more generous space for localisms" (231). Not all islands in the Bahamian archipelago, especially those in the southeast, will share the same sociolinguistic forces that presently impact on language use on New Providence. However, since the population of New Providence today accounts for the majority of Bahamians, the mesolectal BahC spoken in the urban environment of Nassau, which is in close contact with an increasingly Americanised Bahamian English, can be considered most representative.

2.3 Sociolinguistic variation in the Caribbean

Caribbean creoles today are typically spoken in societies which are still affected by their colonial past and continue to be under pressure from external language and culture. They are also subject to urbanisation, migration, and other processes of social change, which continuously reconfigure society as a whole and require the (re-)construction of national as well as personal identities. In the anglophone Caribbean, creoles coexist with English, which has remained an ambient language of power throughout history, and today functions as the nations' official language in the form of increasingly localised standards. From a variationist perspective, linguistic and social structure are correlated, and so it comes as no surprise that creole speech communities are often claimed to display a particularly high degree of linguistic variability (e.g. Holm, 2004, 54-55). Systematic variation, or "orderly heterogeneity", is of course a characteristic inherent to all living languages. Individual speakers are not considered members of the same speech community because they all speak alike, but because, in Labov's (1972) terms, they participate "in a set of shared norms", which "may be observed in overt types of evaluative behavior, and [in] the uniformity of abstract patterns of variation" (120-121). These variation patterns manifest themselves at the level of community, where internal (linguistic) and external (social and stylistic) constraints govern the distribution of alternating forms. Creole speech communities differ from prototypical monolingual contexts in that, depending on their sociolinguistic profile, they may possess an especially wide range of linguistic differentiation and potentially "burst the bounds prescribed for single language varieties" (Patrick, 2008). At the same time, it is equally problematic to treat creole societies as essentially multilingual, because variation between individual grammars tends to be extremely fine-grained and it is usually difficult to clearly demarcate the varieties involved. Variation in creole societies is therefore often described in terms of a *creole continuum*, but there remains some disagreement concerning the model's implications for the relationship between the polar varieties, i.e. Creole and English. These are fundamental issues and they will be further explored in section 2.3.1. Section 2.3.2 will look more closely at the status of English and creole and associated attitudes in Caribbean societies and, more specifically, in the Bahamas. Section 2.3.3 will turn to aspects of social and stylistic variation proper and review findings of sociolinguistic studies, mainly in the variationist paradigm, which have been conducted in the Caribbean context. As the great majority of sociolinguistic studies in Caribbean creole speech communities have focussed on the distribution of grammatical variables, section 2.3.4 will pursue the question whether phonological variables might be expected to pattern differently.

2.3.1 Modelling synchronic variation

In its simplest and most neutral form, the notion of a *creole continuum* evokes the familiar picture that variation across speakers is extremely fine-grained and not easily amenable to classification into a finite number of clearly delineated, self-contained dialects. The creole continuum is a version of the classic dialect continuum with a special twist: its polar varieties are a creole on one end, and its lexifier on the other. DeCamp (1961, 1971b) introduced the concept to account for synchronic variation in the Jamaican context, rejecting the diglossic model that Ferguson (1959) had proposed for Haiti: "There is no sharp cleavage between creole and standard. Rather, there is a linguistic continuum, a continuous spectrum of speech varieties ranging from [...] 'bush talk' or 'broken language' [...] to the educated standard" (DeCamp, 1971b, 350). Similar continuum situations have been identified in a number of other anglophone Caribbean societies, including Guyana, Belize, Trinidad and Barbados (Winford, 1997, 236). Bickerton (1975) provided the terms *basilect* and *acrolect* as sociolinguistic labels representing the varieties found at the endpoints of the language spectrum, which have become fairly standard in the field. The basilect is defined as the variety which is structurally furthest removed from its lexifier, while the acrolect refers to the local standard variety of the lexifier, "which differs from other standard varieties of the language only in a few phonological details and a handful of lexical items" (24). Varieties in between these polar varieties are referred to as *mesolectal* and speakers are considered to occupy not a single point but a span of varieties on the cline, adjusting their speech patterns as required by context and socially defined notions of style.

As originally conceived by DeCamp (1961, 1971b) and Bickerton (1973, 1975), continua and their mesolects were considered the direct result of *decreolisation*, whereby successive groups of creole speakers gradually modified their speech towards the local standard/lexifier language.

> [T]he creole continuum owes its existence to the fact that, after emancipation, the social, political, and economic barriers between whites and non-whites

> were gradually but progressively weakened – while white norms remained [...] dominant in the community as a whole. In consequence, a slowly increasing segment of the creole-speaking population was provided with both opportunity and motivation to modify its linguistic behavior in the direction of the approved variety. (Bickerton, 1973, 644)

As Rickford points out (1987, 32-37), there are two assumptions underlying this perspective: First, "post-creole speech continua" (DeCamp, 1971b) must have evolved from discrete and relatively homogenous linguistic systems in essentially bilingual situations; and second, linguistic variation in creole continua always reflects ongoing change, invariably directed towards the standard. Both claims have meanwhile been qualified somewhat by subsequent research. Due to differences in the extent and nature of interethnic relations, a continuum of varieties between creole and lexifier was likely in place from the earliest days of African-European contact. While post-emancipation decreolisation may still have played a role in shaping the present spectrum of variation when social changes brought increasing opportunities of social mobility and education to the black population, mesolectal forms would have already been available and the process might more appropriately be described as language shift to successively higher lects on the continuum as each sector of the population gradually adopted some of the speech characteristics of the social group above it (Rickford, 1987, 34; Winford, 1997, 248-249). A further point of criticism is that, in this scenario, speakers are still presented as more or less passively adopting overtly prestigious linguistic features rather than portraying them as actors in shaping and negotiating their personal identities and positioning themselves in a net of complex social relations. It is incorrect to assume that the standard is considered the only variety of social value in creole contexts, that Caribbean speakers "have nothing but loathing for their native creole and nothing but longing for the Queen's English" (Rickford, 1987, 36). In reality, the situation is more complex then that. In everyday life, speakers engage in style-shifting both up and down the creole continuum, and, while this may or may not reflect or preview linguistic change, it certainly illustrates that attitudes towards creole speech are not always negative and attitudes towards standard speech not always positive. The topic of language attitudes and social status of varieties in the Caribbean will be discussed further in section 2.3.2 below. For now, it is important to emphasise that earlier assumptions associated with the notion of the creole continuum as a continuously and unidirectionally changing structure, with the acrolect as the target, can no longer be upheld. This issue may only be of secondary relevance to this study, which is concerned with a primarily synchronic description of urban BahC, but it helps put into perspective present-day sociolinguistic variation. For a more detailed treatise of the concept of decreolisation, see e.g. Winford (1997).

Researchers today generally agree that the continuum notion is appropriate for the synchronic description of the range of varieties found in spoken language use in anglophone Caribbean creole situations, at least from a sociolinguistic perspective. Much controversy, however, surrounds the theoretical nature of the creole continuum and the attempts to translate surface variation into a formal linguistic construct. DeCamp (1971b) pioneered the linguistic use of implicational scales as a method to simplify and constrain the amount of random variation by displaying ordering relations between individual speakers and between linguistic elements with respect to a common underlying property of more/less creoleness (see also DeCamp, 1971a; Bickerton, 1973; Rickford, 2002). The continuum, in this view, is not only a descriptive tool of the sociolinguistic manifestation but of the underlying system itself, which must be conceptualised as a succession of lects accounted for by a single set of rules. DeCamp (1971b, 353-354, 357) acknowledged that the strict, unidimensional rendering of the continuum model may constitute a necessary simplification, emphasising, however, that at least in the Jamaican context linear ordering of lects from creole to standard represents a reasonable approximation to systemic reality. He agreed that social correlates of linguistic variation may indeed be multidimensional, but his formulation of the continuum model focussed explicitly on internal linguistic constraints only: "both the varieties and the defining features of a linear linguistic continuum can be ordered without recourse to the sociolinguistic data" (DeCamp, 1971b, 355). As the range of linguistic variation would have been established independently from external factors, social and other contextual data might then be correlated with the linguistic structure without circularity of argument such as "words characteristic of high-school graduates are commonly used by high-school graduates" (DeCamp, 1961, 82). Nevertheless, social factors and their close association with certain areas on the linguistic creole continuum were part of the model's attraction from the beginning. DeCamp (1971b) himself noted, for instance, that "the very old and the very young tend more towards the creole end of the continuum than do young adults" (357) and that the socio-economic standing of informants was "roughly (not exactly) proportional to these informants' position on the continuum" (358).

Today, the use of implicational scales has fallen out of favour and variation in creole speech communities is usually modelled using variationist and other sociolinguistic approaches (Winford, 1991, 570-571). Issues concerning the speech continuum's theoretical underpinnings, however, are still debated. Winford (1997) took a broad Caribbean perspective in re-examining the validity of the continuum model based on findings that several authors had contributed over the years to the description of creole speech communities in mainly Guyana, Jamaica and Trinidad. While recognising that the view of the continuum is valid from a sociolinguistic perspective, he argued for a coexistent-systems approach, which allows for "a certain degree of overlap between systems" (Winford, 1997, 263).

Winford (1985) had previously made a case for classifying creole continuum situations as instances of diglossia. Diglossic speech communities are characterised by the coexistence of two language varieties and by sharp functional and sociocultural differentiation between these two codes. The higher-status variety (H) has overt prestige and is regarded as superior to the lower-status variety (L). H is codified and functions as the local standard, but typically it is acquired only through school education and the first language of the majority of the population is L. This functional differentiation between an H and an L code has obvious appeal for the analysis of Caribbean sociolinguistic contexts, but the original concept of diglossia as proposed by Ferguson (1959) was quite specific on a number of points, which included not only sociocultural but also linguistic criteria: H and L belong to the same language and are perceived as such, H and L are in stable opposition but the tension may be resolved by unstable intermediate forms, H has a more complex grammatical structure than L, and H and L have the same underlying phonological system. While some creoles and their lexifiers may satisfy the structural requirements, it is problematic to claim that a definite genetic relationship exists between the two varieties. Stability of opposition between creole and lexifier may potentially also be an issue, if it is considered central to the concept of diglossia that it "typically persists at least several centuries" (Ferguson, 1959, 240). Meanwhile, Winford has abandoned any reference to diglossia, presumably in part due to the terminological issues attached to the concept, but his coexistent-systems approach to creole continua retains many of the key features of diglossia. He claimed that empirical analyses reveal "a high degree of homogeneity at polar ends of the continuum, in the creole vernacular of the working classes as opposed to the formal usage of the educated middle classes" (Winford, 1997, 274) and, thus, provide evidence of relatively self-contained, if not completely discrete, socially-anchored grammars:

> I argue for a co-existent systems approach to these situations, which sees the continuum as a sociolinguistic construct, the result of interaction between relatively stable grammars in contact, producing complex patterns of variation conditioned by social and situational factors and constrained by the degrees of overlap or mismatch between these grammars. (Winford, 1997, 274)

Patrick (1999b,a) presented a quantitative variationist study of several linguistic variables in the urban Jamaican mesolect and reevaluated the usefulness of the creole continuum model with focus on the notion of non-discreteness. Having found extensive continuity in some areas of grammar, extending not only to phonological but also to morphosyntactic subsystems, he affirmed "a moderate version of the pro-continuum position" (Patrick, 1999b, 292), which holds that the Jamaican situation is characterised by asymmetry in the distribution of English and creole norms:

> Since the variable presence and systematic integration of English forms and rules defines the mesolect, there appears to be no clear dividing line *in the grammar* between the mesolect and the acrolect [...]. But the absence of such knowledge boldly marks off basilectal speakers. (Patrick, 1999a, 119)

Thus, creole norms were highly focussed in the basilect, which should therefore be analysed as a relatively self-contained system. In general, however, the creole continuum "should really be the default model since it is the most descriptively adequate – at least when it is linked to a concept of the mesolect which crucially involves differential knowledge of standard structures" (Patrick, 1999b, 293).

While Winford (1997) and Patrick (1999b) arrived at different conclusions regarding the underlying linguistic structure of continuum situations, they both integrated social factors into their analyses of linguistic variation and agreed that, from a functional, sociolinguistic perspective, that is from the way that linguistic behaviour correlates with social stratification, the notion of a continuum is valid. Deuber (2014) analysed stylistic variation in conversations of educated Jamaican and Trinidadian speakers and proposed that "a style-based sociolinguistic conception of the continuum [...] should [complement] earlier conceptions based primarily on social class membership" (243). She argued that speakers have reinterpreted and adapted the range of linguistic variation characteristic of Caribbean creole situations for use in finely-graded identity projections and varying discourse contexts. The stylistic connotations of different forms and the frequencies with which they are used reflect a continuum of variation between creole and local English. From a linguistic perspective, however, she contended that, as Patrick (1999b) had emphasised on the basilect as a focussed, relatively self-contained variety, her data revealed the same about the acrolect. Her quantitative and qualitative analysis of morphological and syntactic variables showed a decline in the use of creole and creole-influenced features from anti-formal to informal to neutral discourse contexts. This presumably indicated a gradual increase in the adoption of English norms in line with an underlying linguistic system of English, which must be as focussed as the creole system at the basilectal end of the continuum. Deuber (2014), thus, supported Winford's (1997) view that "English and Creole can be separated as linguistic systems" (242), which necessarily share the use of certain forms and are characterised by a partial overlap.

What about the Bahamian context? Lawlor (1996) argued that differences in island settlement patterns and socioeconomic development gave rise to a continuum of varieties ranging from"a creole system in the southeast islands to an English dialect in the northeast islands with speech varieties in New Providence intermediate to these two extremes" (10). She also proposed that the socially-conditioned differences in the development of these varieties was variably reinforced by the relative isolation of settlements, which lead to three "discrete [linguistic] systems" (10) underlying varieties in the geographically defined groups. Lawlor's notion of a continuum is notably different from what is commonly understood as a (socio-)linguistic continuum in the Caribbean context. It is reminiscent of the concept of a regionally-based dialect continuum, where the geographical rather than the social dimension of variation is put into focus. Her observations on the linguistic situation in the Bahamas parallel those on language use in Guyana, where urban and rural creole varieties are presumed to have emerged independently from one another. According to Winford (1997), this led to a rare "tripartite organisation" (274) of the Guyanese continuum and to continued interaction between three principally autonomous linguistic systems: a basilectal rural creole, an intermediate urban creole and a local form of standard English.

Donnelly (1997) took a different view and argued, to the contrary, that "[g]iven the years of isolation [...] and given the little communication that did take place with other islands [...], [i]t is striking that language features are as uniformly distributed throughout The Bahamas as they are" (19). She contended that most features which distinguish the basilect from the acrolect occur in all parts of the Bahamian archipelago, and even those which have regional connotations are typically not exclusive to the locations with which they are associated. In linguistic terms, she consequently described the Bahamian situation as "two distinct systems masquerading as one" (17), referring to the popular conception among Bahamians of BahC as merely a dialect of English.

So far, no detailed studies have been conducted to address these questions, and it is also not of immediate concern to the present study, which focusses explicitly on language use in Nassau, New Providence. The urban vernacular has previously been characterised as an intermediate creole variety. It is in contact with creole varieties from the Bahamian south and dialectal varieties from the north, in relation to which it may be referred to as a mesolectal form of BahC. In addition, it interacts locally with foreign as well as Bahamian varieties of English. Variation patterns in the use of associated variants can be expected to correlate with internal and external factors, mediated by the local evaluation of features by socially-aware language users, who live in an urban environment which must be considered equal in social complexity to other urban environments where better-researched metropolitan or creole varieties of English are spoken, such as New York (Labov, 2006) and Kingston (Patrick, 1999b). While the range of variation anticipated in the use of phonological and phonetic vocalic variables in the present study may indeed arise from the structured interaction between two or more relatively self-contained linguistic systems, I agree with Patrick (1999b, 292-293) that the default approach to the study of language use in mesolectal creole speech communities should draw on the creole continuum in its conception as a unified system, since departures from it can be characterised more clearly than the reverse. In the coexistent-systems approach, gradual and quantitative differences in the use of certain variants are expected and considered to exemplify the socially and stylistically grounded interaction between the systems involved, so that the finding that a speech community displays such gradual patterns is not enough to falsify the initial claim. It is, however, relatively rare to find near-categorical distinctions, and rarer still to find that discontinuities happen to coincide across several variables or even several grammatical subsystems, which would point to an underlying linguistic boundary and delineate the workings of separate linguistic systems. From a practical point of view, then, I will assume that speakers in this study have established a unified set of norms on the basilect-to-acrolect continuum. It remains to be determined what those norms are, how subsystems relate to one another, and whether the upper and lower bounds of the continuum, that is near-basilectal and near-acrolectal forms, are sharply delimited or finely graded. Quoting Patrick (1999b) once more, this "is not an article for linguistic faith but a matter for empirical investigation" (11).

2.3.2 Language attitudes

The significance of language attitudes for sociolinguistic research is indisputable. Patterns of social differentiation, style-shifting and other forms of synchronic variation can only be interpreted if findings about the distribution of relevant linguistic variables are complemented by an understanding of the social evaluation associated with their use in society as a whole and in the context of different social, functional and interactional domains. The same is true for the investigation of diachronic processes, where an understanding of evaluative patterns is critical for attempting to explain the occurrence and direction of linguistic change. The traditional, "standard view" (Rickford, 1985, 146) of evaluation patterns reported for anglophone Caribbean societies is that of a good/bad dichotomy of attitudes towards English and Creole, respectively. Mühleisen (2002, 58-64) argued that the development of negative attitudes towards creoles was fuelled by the same sociohistorical processes which led to the emergence of these language varieties: The sustained power asymmetry of planation society perpetuated the association of creoles with the language use of speakers at the very bottom of the social hierarchy, who lacked the opportunity and, presumably, according to the ideology of the time, the capability to fully acquire the grammatical complexity of 'proper' English. Where creoles remained in direct competition with their lexifier, they never fully gained linguistic autonomy; they were considered forms of 'bad' or 'broken' English, vulgar 'corruptions' of their lexifier, and, as such, unfit for use in official, public domains and among higher social classes. After independence from Britain in the mid 20th century, the linguistic status quo was maintained and English remained the dominant language in all sectors of public respectability. Creoles, in turn, remained stigmatised and the interaction of (lack of) linguistic autonomy and functional elaboration with negative language attitudes, grounded in beliefs about the social as well as linguistic inferiority of creole varieties, perpetuated their negative image. As Rickford (1985, 147), however, pointed out, "if everyone agrees that non-standard or Creole varieties are bad and the standard language good, why hasn't more progress been seen in the elimination of the former?" During the past decades, the anglophone Caribbean has arguably witnessed some changes in the beliefs and values associated with creoles, and, while the main functional distinction between English as the formal standard and Creole as the informal vernacular remains intact, a good/bad dichotomy of attitudes does not capture whole picture. In the literature on the status of language varieties in the Caribbean, the changing attitudes towards creoles are typically presented in two ways: First, the functional distribution of English versus Creole in various social domains is reported, focussing on the degree to which the latter has encroached on the domains of the former. Second, evaluative reactions of language users are investigated more directly, either in the form of questionnaire studies or as an integral part of sociolinguistic interviews. The following two sections will focus on each of these perspectives in turn.

2.3.2.1 Functional distribution in social domains

In the anglophone Caribbean, standard English was traditionally the exclusive variety of high, overt social prestige and officialdom and, as such, it dominated all official and public domains. The domains used to explore the inroads made by creole varieties usually include government and politics, education, mass media, and literature and performing arts. The following overview of the functional distribution of standard English and Creole in the Caribbean in general and in the Bahamas is based mainly on the more detailed discussions found in Carrington (1999) and Hackert (2004).

According to Carrington (1999), Haiti is the only Caribbean nation which identifies its (French-lexifier) Creole as a national language within its constitution (42). In several countries, there is some formal provision for the use of creole varieties, but, in general, standard English is used in all aspects of formal political life. While creoles, therefore, do not usually enjoy any kind of official status in the political system, it is during election campaigns that their indirect political importance is showcased. Those who seek elected office "must prove their popular *bona fides* by displays of bilingualism, including competence in the vernacular Creole language" (42). The same situation applies to language use in the Bahamas: Government and politics are still clearly the domain of English and standard English is used in parliamentary debates and in administration. Politicians make frequent use of BahC in their speeches during campaign rallies, but, even then, the mixing and switching of codes is mainly employed as an emotional rhetorical device signalling authenticity, humour or abuse. Content in politics, be it the budget or foreign policy, is discussed and presented to the public in standard English (Hackert, 2004, 56-58).

The education sector in Caribbean societies has been a traditional battleground for those with particularly strong views on the relative status and usefulness of creole and standard language varieties. The education systems historically spread from Britain to the colonies and from higher to lower social classes, so the standard language in the education context, including classroom interactions, is English. From a purely educational perspective, one could point out that it is problematic to use a communicative tool for the instruction of children which they do not completely understand. In the Bahamian context, for instance, one teacher interviewed by Hackert (2004, 62) estimated that less than 10% of Bahamian students entering school are fluent in English. Virtually all education systems therefore recognise the need for an acculturation period at the primary school level, but the use of creole is usually relegated to auxiliary functions and any provisions made are idiosyncratically implemented by teachers, schools, or school districts (Carrington, 1999, 42-44). In the Bahamas, like in the anglophone Caribbean region in general, standard English remains the unchallenged medium of formal instruction. The introduction to standard English in primary levels often resembles "a structured immersion program as is used in bilingual contexts" (Hackert, 2004, 62). In terms of curricular status, attitudes towards BahC as a culturally-valued means of expression have improved somewhat throughout the last decades. While the main goal of language education is still clearly focussed on achieving good proficiency in English, BahC is mentioned explicitly in several learning objectives in the 2009 Primary Language Arts Curriculum (Department of Education: Humanities Section, 2010), which seem to be geared primarily to raising the pupils' awareness of the linguistic options required in different communicative contexts; for example: "Use Standard English and Bahamian Dialect appropriately according to the purpose of the speech and audience" (Department of Education: Humanities Section, 2010, Objective 1.55) and "Distinguish between Standard English and dialect expressions" (Department of Education:

Humanities Section, 2010, Objective 3.56). Presumably, this is to be achieved by explicit contrastive study of BahC and standard English features, which would, of course, first require that teachers themselves are aware of the linguistic boundaries separating the varieties involved. According to Hackert (2004, 64), in this respect as well as in terms of teachers' general recognition that both standard English and BahC are valuable assets, "great strides have been made". However, this does not mean that the general public appreciates the use of BahC in schools: "Many parents and community leaders still see StE as the only path to advancement and take any attempt at using BahCE in the classroom as an attempt to block that path" (Hackert, 2004, 64). Oenbring and Fielding (2014, 45-46) asked local university students about their preferred functional status of BahC in the classroom, and the results are sobering. Only slightly more than 30% of the participants agreed that BahC "should be taught in addition to Standard English" and that it "should be used by teachers to explain concepts to students and/or run the classroom". On average, educational majors expressed significantly more conservative attitudes towards the use of BahC in education than their peers and it seems that, for the time being, the role of BahC as a topic as well as means of classroom interaction will remain clearly subordinate to that of standard English.

The mass media is another domain traditionally dominated by standard English, into which creole varieties have made some limited inroads. In the print media, their longest established use has been in humour. Leading Bahamian newspapers use BahC as a stylistic device employed for the effect of authenticity and informality, mainly in cartoons and columns, but serious topics, as elsewhere in the Caribbean, are still treated in standard English. Local news items may contain verbatim quotations from witnesses of current events, clearly marked as such and separated from the main text (Carrington, 1999, 45; Hackert, 2004, 58). The use of Caribbean creole varieties in television broadcasts is also relatively rare, as much of the video material is of foreign, mainly American, rather than local origin. The Bahamas Broadcasting Corporation runs a single television station, ZNS, and even there international news items are often taken straight from North American TV stations. Some creole elements may be heard in Bahamian news reports, which variably include short clips of interviews with locals, but most segments on ZNS feature scripted speech and are therefore delivered in standard English (Carrington, 1999, 47; Hackert, 2004, 58-59). In general, the use of Creole is more readily accepted in spoken than in written or scripted contexts, which is not surprising seeing as Caribbean creoles are not usually supported by widely known writing systems. The use of creole varieties is more widespread in radio broadcasts, which feature popular call-in talk shows for both entertainment and discussion of contemporary issues. Hackert (2004) noted that the radio has played a prominent role as a national news medium for the Bahamian Family Islands and that it is still more central to public life in the Bahamas than in other countries. It is, therefore, of greater relevance than may be considered otherwise that much discussion of local events, frequently involving political debate, takes place in the local vernacular when "the tacit agreement of StE as the public formal variety [...] temporarily ceases to be in force" (58). Another area in which BahC can be heard on both local radio and television stations is advertising. Globally available brands are usually presented in standard English, but local products and services may be advertised with recourse to local language use. Here, too, however, creole features are mainly employed for stylistic effect (Hackert, 2004, 58). In more positive connotations, the use of BahC may signal humour and realism; as Oenbring and Fielding (2014, 34) pointed out, however, it is may also serve as the voice of "the 'unsophisticated' mindset that needs 'correcting' ".

A special public domain in which Caribbean creoles have long enjoyed prominence and are widely accepted and even treasured as symbols of local culture is the domain of arts and literature. The Caribbean music industry is essentially based on Creole, and the international spread of these forms of music has shifted the acceptability and regional value of the vernaculars as expressions of cultural identity (Carrington, 1999, 48). At least in the Bahamian context, in addition to diverse global and local influences, black American hip-hop culture is a particularly audible and visible source of identity for the youth culture. Based on an anthropological analysis of the bling and pomp of Bahamian high school prom-goers, Thompson (2011) showed that "young people [...] consume hip-hop through a powerful combination of the visual and the auditory" (28). The Bahamian government has apparently taken steps to censure or curtail displays of American hip-hop culture in local television offerings as well as prom parties in an attempt to stop the perceived "moral decay of societal values" (36), but these actions have only served to politicise the movement as antiauthoritarian and as "not so much anti-colonial as [...] postnational" (27). Thompson (2011) thus argued that young Bahamians' search for new ways of self-presentation draws on cultural expressions and "representational vocabularies from the African diaspora, especially from black America" (27). Music and lyrics in the Bahamas may therefore be considered a domain, in which not only the use of local/Caribbean but of black American vernaculars in general are variably appreciated.

As in music, the Caribbean stage and literary tradition has long been a forum in which creole varieties have been employed for artistic effect. The range of topics has transcended the early comic material and "[d]rama of the most serious contemporary type" (Carrington, 1999, 48) is presented in Caribbean creoles. Ian Strachan, a Bahamian author and stage actor, explained that his main motivation as an artist is the wish to transform Bahamian society, to make it "a more egalitarian society, a more tolerant society, a more democratic society, a society that is less exploited and exploitive" (Strachan, 2007, 80). He argued that this goal can only be achieved from within the Bahamian community and that art must draw on local culture: "The answer is not Broadway, but the bush. [...] I use the bush here metaphorically to represent a style, a mode, a rhythm, a sound, an art, one that comes from within. An art that is rooted in what we have and what we live" (93). While the words of one artist cannot be representative of all Caribbean writers, it emphasises the fact that literary exploration in the Caribbean is being broached by authors and performers who understand their work as deriving from and interacting with local society and culture. As Carrington (1999, 48) argued, literary publications have done more to improve the public image of creole varieties and advance their societal functions than day-to-day press releases, but it is unclear what effect such mainly ideological developments might have on the average Bahamian. According to Oenbring and Fielding (2014, 35), the Bahamas lag somewhat behind some of its Caribbean neighbours in that there remain very few print-published and widely available creative works incorporating BahC. One notable exception is Telcine Turner Rolle's *Woman Take Two*, a play read by Bahamian pupils in both private and public schools.

It seems that, in general, not much has changed regarding the functional distribution of Creole and standard English in various public domains in the Caribbean and in the Bahamas. The use of BahC has encroached on some subdomains which involve direct interaction between people of different socioeconomic status or where the goal is to achieve a special stylistic effect such as humour or realism, but in most aspects of public life, BahC clearly plays a subordinate role to standard English. An exception to this pattern is the domain or arts and literature, where creole varieties are treasured for their cultural value and their direct sociopsychological connection to their speakers. Carrington (1999) suggested that a measure whereby the status and changing attitudes towards creole varieties are determined by the degree to which they have encroached on traditionally standard-dominated domains may be flawed because it is based on the assumption that these are the only domains relevant for the acquisition of status and prestige:

> The assumption that Creoles acquire status as they penetrate the domains of the official language is part of an established pattern of the measurement of success in Creole societies. For instance, the progress of the formerly enslaved and indentured has been determined by the extent to which they have replaced the planter class in the latter's spheres of action. Success by occupation of the enemy's space! However, we must be prepared for the possibility that the occupation of the enemy's space may no longer be the most useful index of status. Creole societies may have evolved sufficiently beyond the desire to replace the planter that the measures of status have to be revised. (Carrington, 1999, 49)

Mühleisen (2002, 30-42) argued that language attitudes in the anglophone Caribbean have certainly changed, but that such changes have been gradual and that their effect on language use manifests itself not on the level of domains but on the level of discourse. These and other notions of language attitudes in the Caribbean will be presented below.

2.3.2.2 Evaluative reactions

One problem with studying attitudes towards language and language varieties is connected to the uncertainty of what attitudes are and, consequently, the vagueness surrounding the term. In the following outline of attitudes towards creole and standard varieties in the anglophone Caribbean, attitude is understood as "a learned disposition to think, feel and behave toward a person (or object) in a particular way" (Allport, 1954, cited in Garrett, 2010, 19). This often-cited, economic definition by Allport highlights that attitudes are social constructs – they may not be 'learned' in the traditional sense of the word but they are acquired through socialisation in a socially and culturally defined community of attitude-holders. The term 'disposition' implies that attitudes pre-exist seemingly ad hoc evaluative responses and that they have a degree of stability which allows them to be identified. Finally, Allport's definition emphasises the tripartite structure of attitudes: Attitudes are not only an affective response to certain stimuli, but they also have interrelated cognitive and behavioural components (see detailed discussion in Garrett, 2010, chapter 1). Applied to the anglophone Caribbean context, Mühleisen (2001, 45) argued that beliefs about creole varieties and their speakers, that is what attitude-holders take or took to be factual knowledge, had a causal effect on the traditionally negative attitude formation towards creoles. Given the social conditions during creole formation and its association with uprooted, socially subordinate and oppressed speaker groups, emergent creole varieties were regarded as "the fragmented language of a fragmented people" (Wassink, 1999b, 58). Socially- and racially-based contempt for creole speakers was compounded by the linguistic ideology at the time, which held the highly inflected grammars of Greek and Latin in the highest esteem and used them as yardsticks in the comparison of presumed logic and inherent value of other linguistic systems. English-lexifier creoles were not 'proper' English – they lacked, in particular, standard English conventions for marking grammatical contrasts – but since many of their lexical items derived from English ones, there was no immediate reason to assume they might be anything other than English. Accordingly, creole varieties were conceptually aligned with English and found to be lacking in comparison; they were considered 'corrupted', 'defective', 'uncouth', 'barbarous' or 'infantile' versions of European English (see e.g. Holm, 2004, 18-24). Most researchers reporting results of attitude studies conducted in Caribbean creole speech communities today conclude that their data present a picture of both continuity and change. While creole speakers are increasingly willing to display pride in their local language variety and acknowledge that there are times when the use of creole is more appropriate and effective than the use of 'correct' English, they are also very much aware of the social stigma still attached to the public use of creole and are eager to avoid it.

In the early 1970s, Winford (1976) conducted a questionnaire survey among trainee-teachers in Trinidad, aimed at speech evaluation and acceptability ratings of Trinidadian language varieties by different groups of speakers. He found that respondents showed great awareness of different language varieties and that the use of these varieties reflected a "conflict of value-systems" (46): Striving towards a standard English model was inseparably linked to upward social mobility, while creole varieties, which develop from day-to-day participation in social groups, were valued to varying degrees as a means of colourful expression and identification with friends and family. Crucially, however, Winford's analyses showed that negative attitudes towards Trinidadian Creole (TrinC) prevailed. Although two thirds of the respondents indicated that "Trinidadianese was their most natural medium of speaking" (62), they had a strong tendency to classify features of their local vernacular as 'bad English', with rural speakers being more linguistically insecure than speakers from urban areas (49-56). When asked to comment on particular groups of Trinidadians whose speech they considered either good or bad, their responses correlated with both social status and level of education (66-67). Twenty years later, Mühleisen (2001) designed a follow-up study and she reported that all her participants refused to acknowledge the term "bad English" as referring to TrinC. When she rephrased the questions accordingly, she found that the majority of morphosyntactic and phonological features identified as typical of Trinidadian speech were still considered not acceptable as English (50-51), but she argued that this does not necessarily imply a negative attitude towards the creole. As in Winford's study, about two thirds indicated that TrinC was their most natural medium of communication, and most respondents agreed that they could generally infer both the level of education (87%) and social status (76%) from an individual's speech patterns. However, it was pointed out repeatedly that inter-speaker variation was confounded by intra-speaker variation depending on various factors including functional domains and interactional contexts (Mühleisen, 2001, 57-58, 60-61). Mühleisen (2001) concluded that, while a functional distinction between English and Creole is maintained, negative evaluations of TrinC based on notions of (in)correctness and aesthetic value judgments are disappearing and the concept of "'Bad English' truly seems a dying form" (75).

Wassink (1999b) conducted a similar study in the Jamaican context. She administered a tape-recorded questionnaire to respondents in a semi-urban community close to the capital city of Kingston, which was centred around beliefs concerning the linguistic identity and viability of Jamaican Creole (JamC), popularly known as Patois. Her respondents showed to be reluctant to equate Patois with 'broken' English (16%) and of those who did the majority were members of the oldest tested age group (68). On the whole, however, the study showed that the use of Patois still seemed to reflect rather unfavourably on the individual who uses it. While more or less abstract feelings toward the creole were relatively positive – for instance, more than 70% agreed that Patois is an asset to know and has the same expressive potential as English (72) – this did not translate into a generally more positive attitude towards the use of the creole. Respondents were consistently more willing to be addressed in Patois than to use it themselves, they preferred their children to understand Patois but not to speak it, and when asked which language variety people in general should rather use, 70% stated they would prefer "mostly English and some Patois" (74). Wassink (1999b) thus argued that her Jamaican respondents did not mentally align Patois with English in the sense that Patois was conceived of as an inferior version of standard English, but that the self-imposed restrictions regarding the use of Patois reflected its continued low overt prestige and social stigmatisation.

Hackert (2004, 54-56) presented a picture of language attitudes in the Bahamas in the late 1990s, based mainly on extended sociolinguistic interviews with working-class speakers. She found that, while for many working-class Bahamians competence in standard English was limited, basic beliefs and evaluations of different Bahamian varieties transcended ethnic and social boundaries. The distinction between BahC and standard English was generally unclear, reflected in the creole vernacular's local name 'Bahamian Dialect' as well as in the acceptance of labels such as 'bad' or 'broken' English. The use of BahC was consistently associated with backwardness and lack of education and it was generally considered an obstacle to individual speakers' social aspirations as well as to modernisation and international integration of the Bahamas as a whole. Most Bahamians, however, were unwilling to completely eradicate BahC, feeling that it was a part of Bahamian heritage and culture. Oenbring and Fielding (2014) recently provided insights into the perspective of young, educated Bahamians in Nassau. An online survey was distributed among Bahamian college students in order to supplement and review earlier findings, and, on the surface, not much appeared to have changed, as over 80% agreed that BahC is "a form of 'broken' English" (42). On average, however, the respondents were more vocal about positive social evaluations of their local vernacular. Only 32% thought that standard English was better than BahC, 56% said they enjoyed speaking BahC and 72% were proud of BahC (42-43). In light of these favourable ratings, it is unclear in how far the term 'broken' English can be equated with 'bad' English, or, indeed, in how far it is necessarily conceptually aligned with English at all, since 50% of the respondents agreed that BahC and English are different languages and another 25% were undecided on this issue. In the Bahamas, 'broken' English may have become a fixed term, used to refer to English-lexifier creoles in the Caribbean, and, consequently, any attitudinal dispositions would have to be established independently.

All language attitude studies introduced above include acceptability ratings of the use of English and Creole in various functional domains and interpersonal contexts of varying degrees of formality. In general, the results line up with the complementary distribution of English and Creole outlined in the previous section from the perspective of language use in public domains: Creole usage was frequently judged to be appropriate in informal, humorous and in-group situations, while standard English was preferred in formal, serious and out-group contexts. These functional relations seem predictable within the sociolinguistic framework of overt and covert prestige. Overt prestige is a community's widespread positive social evaluation of the linguistic forms employed by a high-status group, whereas covert prestige is the positive evaluation of a socially stigmatised variety at a smaller, more local level. The main evidence for the existence of such covert norms, as Labov (2001, 512) noted, "is the fact that nonstandard forms persist". In mainstream language attitude research, it is generally acknowledged that attitudes are multidimensional. The two most frequently distinguished dimensions are status/power and solidarity/social attractiveness. Standard varieties tend to be rated favourably on the status dimension, that is they are associated with characteristics such as intelligence, competence, and leadership. Nonstandard varieties, depending on their degree of stigmatisation, are typically rated relatively low on the status dimension, but they are upgraded on the solidarity dimension, which involves characteristics such as friendliness, honesty, and humour. (e.g. Garrett, 2010).

Covert prestige, as the term implies, is not usually expressed overtly, and this may be one of the reasons why it seems so elusive in most attitude research conducted in the Caribbean, which has made use almost exclusively of direct attitude elicitation techniques. When speakers are asked directly about their social evaluation of creole varieties, they may feel comfortable to acknowledge their abstract cultural value or they may praise their expressive potential to convey humour and informality, but complex patterns of linguistic in-group allegiance, especially in cases where the group's identity is associated with long-denied access to education, social mobility or, indeed, equal status as a human being, are a very private and sensitive subject when approached by an outsider. In a rather roundabout way, feelings of linguistic solidarity within the creole speech community can still be detected, such as when 44% of Trinidadian respondents reported they had been in situations where they spoke English instead of Creole and people reacted with hostility, accusing them of pretentiousness or insincerity (Mühleisen, 2001, 64). It may be more informative to test the social evaluation and acceptability of English, which has the potential to, indirectly, throw some light on the speakers' feelings towards creole varieties, but so far attitude studies have focussed primarily on reactions to creoles.

From the outline of attitude research in the anglophone Caribbean, it would appear that attitudes towards creole varieties have evolved from the time when they were simply the most comfortable variety for the majority of speakers and proficiency in English was generally low to their contemporary state as essentially varieties of choice, which speakers can switch to in order to satisfy a variety of social functions. Standard English is still the uncontested variety of overt prestige and used in most public domains and formal contexts. As such, English is associated with a high level of education and high social status, but the reverse does not necessarily hold for creole varieties. Studies have shown that creoles are gradually losing their image of being nothing more but 'bad' English, a language variety inherently inferior to standard English. In private and informal interactions, the use of Creole is appropriate and welcomed; it is treasured for its cultural value and considered a source of local identity. As more and more speakers acquire proficiency in both English and Creole, traditional attitudes are being diluted and language use becomes a matter of style and register, reflecting the interplay of overt and covert prestige associated with all social environments in which standard and non-standard varieties coexist. Of course, functional and symbolic values assigned to language varieties may differ from one individual to another. As Deuber (2014, 35) noted, the creoles' symbolic function of solidarity and national identity may be more relevant to the linguistic analysis of educated speakers, who can and do manipulate their speech according to subtle changes in communicative functions and discourse contexts; for others, Creole may (still) simply be their unmarked variety and more specific social meanings are mainly attached to the use of English.

2.3.3 Studies of sociolinguistic parameters

This section provides a brief overview of the social and stylistic factors that have been tested in the anglophone Caribbean. The aim is not to present a comprehensive resume of individual studies but to point out common issues and prominent findings. Primary focus will be given to studies which have been conducted in the Bahamian context. The investigation into past marking in urban BahC by Hackert (2004) will be treated in more detail, as the data provided by her speakers also form part of the present study. Studies in the sociophonetic paradigm will be introduced in section 2.4.4.

2.3.3.1 Ethnicity

Most anglophone Caribbean communities are more or less ethnically homogenous, with people of African origin constituting by far the largest ethnic group. There are, however, some in which ethnic differences do play a major role. The population in both Trinidad and Guyana, for instance, is almost equally balanced between people of African and East Indian origin, and studies have shown a general trend towards more conservative, creole features in the speech of the latter (Winford, 1991, 573-574).

Black Bahamians (and non-Bahamians) are the largest ethnic group in the Bahamas, constituting about 91% of the total population in 2010, followed by people identifying as white (5%) and mixed black and white (2%) (Department of Statistics of The Bahamas, 2012, 10, 82). The largest immigrant group in the Bahamas are black Haitians, which account for about 11% (Department of Statistics of The Bahamas, 2012, 9-10) of the total population. In some districts, Haitian nationals account for more than 20%, which has raised fears that the Bahamas is being overwhelmed by this group, but in linguistic terms it is unlikely that their presence will have a strong and lasting effect on Bahamian varieties. Haitian immigrants are often associated with illegal status, poor education and poverty. Their vernacular, a French-lexifier creole, is stigmatised in Bahamian society and presents a language barrier which serves to perpetuate the marginalisation of Haitians rather than promote patterns of accommodation (Fielding et al., 2008).

White Bahamian speech varieties are not usually located on the creole continuum, due to the rare occurrence of creole features. As Shilling (1980, 141-142) argued, if one was to place both white and black Bahamian speech on the same continuum, one would have to suppose that white speech was too close to the acrolectal pole to display overt creole features. However, white Bahamian varieties clearly have some non-standard morphosyntactic and, especially, phonetic and phonological features, which distinguish them from standard English, and, consequently, must be considered ethnically distinctive dialectal varieties. Recent studies on black and white Bahamian speech in two enclave communities on the island of Abaco revealed limited, bilateral linguistic accommodation regarding a number of phonological features (Childs et al., 2003) as well as patterns of copula absence (Reaser, 2004). Crucially, however, both varieties remain distinct, as the studies exposed a persistent qualitative and quantitative ethnolinguistic divide.

2.3.3.2 Socioeconomic status

Most sociolinguistic studies of Caribbean varieties have focussed on factors related to socioeconomic status. While social class differences are not uniform across Caribbean communities, individual accounts of the relationship between differences in social rank and differences in language choice display a high degree of similarity: Studies usually report a pattern of correlation between more creole varieties and lower status on the one hand, and varieties closer to English and higher status on the other (Winford, 1991, 571-573). However, social class and socioeconomic status are controversial issues in the literature on post-colonial varieties. Since Labov first correlated linguistic variation and social stratification in the urban speech community of New York City in the 1960s (see e.g. Labov, 2006), sociolinguists have struggled with how to best identify speakers' social classes and organise them into status hierarchies which are meaningful and reflect the social ranking within the studied speech community. The most common approach has been to construct multi-index scales based on attributes such as occupation, education and income (e.g. Labov, 2006, 132-139). A persistent problem with this approach has been that speaker variables like gender, age and ethnicity are known to interfere with established rankings based exclusively on socioeconomic indices, and, thus, have to be controlled for or included as separate factors in the analysis. In post-colonial contexts, a further problem concerns the adoption of multi-index scales designed specifically for industrialised, urbanised Western communities, and the use of these ready-made classifications as "pigeonholes which may fail to do justice to the more complex conditions that hold in a particular locality" (Patrick, 2000, 3). The relatively small societies in the Caribbean have rarely generated elaborate social theories for scholars to draw upon in their studies, but the random application of foreign models is unlikely to deepen our understanding of the relation between social structure and linguistic variation in these speech communities.

Hackert (2004, 50-54), in her sociolinguistic study of past-marking in urban BahC, recognised this problem and provided a short overview of social stratification in Nassau today. While black Bahamians can be roughly categorised into three social groups – the poor lower classes, the nouveaux riches, and the increasingly diversifying middle class – she noted that distinctions are not always clear-cut and that, as social mobility has become a fact of life, members of the same family may be found to fall into different groups. In the absence of detailed sociological studies on social class and social hierarchies in the Bahamas, she opted for a compromise and applied a stratification scheme developed by sociologist Derek Gordon (1987) for the Jamaican context, previously used by Patrick (1999b) in a sociolinguistic analysis of creole varieties in Kingston. Gordon's (1987) model of class, status, and social mobility relies primarily on a classification of occupations. Based on an island-wide survey, Gordon developed a rank-ordered list of 16 occupational groups, further categorised according to production relations, such as ownership, authority and training, into three broad social classes: the *middle strata* (MS), comprising mainly white-collar and managerial employees, the *petit bourgeoisie* (PB), which consists of self-employed artisans and traders as well as small business owners and farmers employing others, and, finally, the *working class* (WC), which subsumes all manual wage-labourers (see table 2.1).

When Hackert (2004, 212-215) correlated the rates of standard past inflection produced by 20 Nassauvian speakers in conversational interviews with their membership in the three board class categories MS, PB and WC, she found that, overall, MS speakers displayed the most standard-leaning behaviour, closely followed by PB speakers; WC speakers showed by far the lowest rates of standard past-marking. Hackert also observed, however, that social class interacted with style defined as different discourse types. When only chat-mode discourse parts were considered, disregarding narratives and folk tales, PB speakers ranked first in their use of standard forms. MS and WC speakers did not shift their speech to the same degree, both groups showing only a slight increase in standard past inflection. Hackert argued that this pattern resembles the hypercorrect behaviour of the second highest status group which is often observed in urban Western contexts. Labov (2006), for instance, found that lower middle class speakers generally showed the greatest shift towards the use of standard forms in more formal speech styles. This led to the well-known 'cross-over' pattern (e.g. 152, 163, 165), whereby lower middle class speakers produce less standard forms in more informal contexts but more standard

Table 2.1: Class categories and occupational groups according Gordon's 1987 model of class, status and social mobility; reproduced from Patrick (1999b, 53)

Class labels	Occupational groups	Example jobs
MS-1	Higher managers/professionals	Civil engineer, attorney
MS-2	Lower managers/office supervisors	Loan or personnel officer
MS-3	Lower professional, technical, sales	Nurse, technician, salesman
MS-4	Secretarial and accounting clerks	Typist, bookkeeper, bank clerk
MS-5	Other clerks (not sales)	Keypunch operator, file clerk
MS-6	Sales clerks	Shop clerk, betting clerk
PB-1	Owner-employers	Gas-station owner, large farm
PB-2	Artisans	Mechanic, dressmaker, taxi
PB-3	Traders	Street vendor, hairdresser
PB-4	Small farmers	Root-crop farmer, fisherman
WC-1	Foremen and higher service work	Line-supervisor, police, chef
WC-2	Craftsmen and operatives	Machine operator, trucker
WC-3	Other service work (not WC-4)	Guard, waitress, messenger
WC-4	Unskilled manual work	Longshoreman, construction
WC-5	Domestic work	Household helper
WC-6	Agricultural labourers	Cane-cutter, fruit-picker

forms in more formal contexts than upper middle class speakers, which is interpreted as hypercorrect linguistic behaviour and, presumably, reflects linguistic insecurity inevitably accompanying upward social aspirations (317-318).

According to Patrick (1999b), differences in social ambition can explain why certain speakers, relative to others, rank higher or lower on a scale of linguistic standardness than on a scale of socioeconomic status. When he positioned ten urban Jamaican Creole speakers individually on a scale of social ranks, based on Gordon's occupational stratification scheme, and related these positions to the speakers' rates of standard variants for four linguistic variables, he found that speakers on the very top and bottom of the status scale behaved as expected, producing the highest and the lowest number of standard forms, respectively. Across the central portion of the scale, however, he noticed a considerable amount of mobility. On closer inspection, a pattern related to age and individual agency emerged, in that all the speakers whose linguistic ranking was higher than their status ranking were young speakers who had expressed optimism about upward social mobility. In the Caribbean context, as has been outlined in the previous section, English language use is strongly linked to social mobility and status. In the absence of educational opportunity for the masses in colonial and early post-colonial times, “social ambition depended on two factors: the proper connections and the right appearance, in terms of both language and skin color” (Hackert, 2004, 214). English became imbued with moral authority and is still today, aside from actual wealth or formal education, an important and salient component of an individuals public face, signalling social standing or ambition. Patrick (1999b), thus, argued that it is only “natural for upwardly mobile young people to manipulate all the symbolic resources available to them in order to project themselves to influential adults as respectable, educated, and therefore deserving of opportunity” (291). Hackert (2004, 217-219) found a similar pattern among the urban BahC speakers participating in her study, though social ambition in this context did not correlate with the participants’ age. She observed that speakers who ranked linguistically higher than socially “were eager to present themselves as respectable in their interviews” (218) and indicated that they would like to improve their social standing. While broad social class distinctions may indeed correlate with language use in the Bahamas, Hackert (2004) concluded that when speakers are considered individually, the relationship between social rank and linguistic behaviour “is at best indirect, with social aspiration as the mediating force” (219).

2.3.3.3 Age

Despite the controversy surrounding the notion of decreolisation of Caribbean creole languages (see section 2.3.1) and the obvious need for both diachronic and synchronic data to investigate supposed linguistic change, whether it may proceed in the direction of an exonormative or local standard or otherwise, surprisingly few studies have explicitly focussed on age differences in Caribbean communities. Longitudinal and real-time studies have shown that some basilectal features of Guyanese Creole recorded around 1990 have been lost and that some Belizean Creole speakers, depending on their lifestyle choices and concomitant changes in social conditions, have come to use more standard features as they grew older (see discussion in Rickford, 1987, 36-40). While, as Rickford (1987) pointed out, these findings are “at least not inconsistent” (37) with decreolisation, they cannot be generalised to all creole speech communities in the Caribbean and, crucially, they do not necessarily imply that the basilectal end of the creole spectrum has become any less basilectal as a whole. As for studies in apparent time, every possible scenario has been documented for individual phonological and grammatical variables, sometimes pertaining to the same community of speakers: no generational differences, increased use of standard variants by the younger generation, and increased use of creole variants by the younger generation (see brief overview of studies in e.g. Rickford, 1987, 37-40; Winford, 1991, 574). In addition to these varied and conflicting results, it is important to remember that synchronic variation is not always indicative of change. Differences in linguistic choices between age groups can signal community-level language change, but they may also reflect a pattern repeated in each generation, i.e. age-grading. Inferences about change in apparent time also need to be qualified in relation to other factors such as social class, urban/rural orientation, education and speech style.

In a number of studies, it was observed that creole speakers' relative level of education is particularly prone to interference with age-related differences. For example, Rickford (1991) investigated the distribution of basilectal singular pronoun usage among three age groups in the rural Guyanese community of Cane Walk and he found that the relative frequency of basilectal variants increased with age. The change from more to less basilectal speech had began earlier, in the intermediate age group, among speakers of the higher social class than among speakers of the lower social class, where only the youngest age group displayed a shift away from basilectal forms. As this pattern correlated with the level of education members of the two social classes were able to obtain, in particular with access to secondary education, Rickford (1991, 614) argued that the decrease in basilectal variants was caused by an increase in formal education.

Hackert's (2004, 203-209) results on age differences regarding rates of standard past inflection among urban BahC speakers corroborate Rickford's theory. Taking an emic approach to establishing age groups, she divided speakers into those who spent their youth during the time of Bahamian nation building, and those who had grown up before, under the British dual system. Overall, Hackert observed a moderate age difference in the use of past inflection: Older speakers made less use of standard forms than younger speakers. This finding, however, came with two caveats. First, the distinction between the age groups became blurred if style in terms of discourse type was added as an additional factor into the analysis. Most non-standard forms occurred in generic narratives and folk tales, and both discourse types were used considerably more frequently by older than by younger speakers.

The difference in past inflection between the two age groups in the more common day-to-day discourse types of personal narratives and chat was negligible. Second, when the educational attainment of the speakers was taken into account, it showed to better model the variation found in the data than age. Hackert argued that, due to the fact that most of the older participants did not have the opportunity to obtain secondary education, the apparently age-related behaviour actually reflected different levels of education, which, in turn, caused speakers to produce different rates of standard forms.

On a related note, it should be mentioned the "the level of education necessary for any particular occupation has increased with the growth in educational opportunity" (Hackert, 2004, 209). What this means for the present study is that a high level of education may correlate well with high social status when considering younger speakers, but this is not necessarily the case for older speakers. Having received only elementary education, several of the older speakers in Hackert's sample had worked their way up and occupied a higher social rank than younger speakers who had attended high school. While the level of education may become an important index to socioeconomic status in the future, for the time being it should be noted that education is known to correlate with age and that occupation, thus, remains the most reliable predictor of overall social status (see Patrick, 1999b, 288).

2.3.3.4 Gender

Winford wrote in 1991:

> Very little work has been done on sex differentiation in language in the anglophone Caribbean. Most of the primary sociolinguistic studies of the area [...] confine their sample populations to men, while others [...] treat sex-based variation as incidental to other concerns, or rely on limited data. (575)

This is surprising, given that linguistic variation correlating with speaker sex has been a vital aspect of mainstream sociolinguistic research from its inception (see e.g. Labov, 2006; Trudgill, 1972). In most of the early variationist studies, demographic categories such as sex, age, and ethnicity were taken for granted, and linguistic differentiation was considered to directly reflect differences in membership in each of these categories and their interaction. The switch in terminology from 'sex' to 'gender' indicated a drastic shift in perspective, a recognition that the notion of a direct indexical link between language use and biological variables such as speaker sex is questionable.

> [S]ex is a biological category that serves as a fundamental basis for the differentiation of roles, norms, and expectations in all societies. It is these roles, norms, and expectations that constitute gender, the social construction of sex. [...] [D]ifferences in patterns of variation between men and women are a function of gender and only indirectly a function of sex. (Eckert, 1989, 246-247)

Both sex and gender are usually treated as binary categories in sociolinguistic research; and while gender differences, essentially a social and cultural construct, do not always map directly onto biologically-based sex differences, much of our social lives are organised around the physiological dichotomy.

Labov (2001) stated that one of the clearest, most consistent results of decades of research in both urban and rural, Western and non-Western speech communities was "the careful behavior of women" (266), that is their linguistic conformity and their preference for standard variants. The finding that female speakers tend to use and consciously adopt a higher proportion of overtly prestigious standard variants than male speakers has been of wide general interest to the research community. Several explanations have been offered for this distributional pattern, ranging from women's supposedly greater verbal abilities or awareness to the social significance of linguistic variants to their apparent desire to sound more 'ladylike' and to avoid the supposed symbolic association of local vernaculars with promiscuity (cf. Cheshire, 2002; Romaine, 2003). Trudgill's (1972) suggestion has been particularly influential. Based on a sample of speakers from Norwich, he found that women tended to over-report while men tended to under-report their usage of standard forms. From this, Trudgill deduced that overt prestige, associated with standard speech, was more important to women, who used linguistic means as a way to achieve social status presumably denied to them through other outlets. Men, on the other hand, were able to acquire social status through their occupational status and income. They were therefore free to turn to the covert prestige of nonstandard forms, associated with the "roughness and toughness" (183) supposedly characteristic of both working-class life and masculinity. Trudgill (1972) essentially suggested that observed gender differences reflect women's relative powerlessness compared to men in the public sphere.

Power relations have always been an implicit issue in gender studies and, according to Mühleisen and Walicek (2009), one of the reasons why research on language and gender has been neglected for so long in Caribbean contexts is that power relations along ethnic lines were considered primary. Early sociological studies claimed that the violence of colonisation and the Atlantic slave trade essentially eradicated gender differentiation, as the ultimate power of the masters over the slaves determined every aspect of the relationships between men and women (Mühleisen and Walicek, 2009, 16). In addition, as Hackert (2004, 216) outlined, female slaves were forced to work as hard as male slaves, and these established structures did not immediately change after emancipation. Bethel (1993) discussed the centrality of women in Bahamian family structure as well as society at large and concluded that, while Caribbean societies have traditionally seen a high level of economic autonomy of the sexes, Bahamian women have become even less dependent financially on the contributions of men. She argued that Bahamian families are structurally and functionally matrifocal, and that the position of authority of women extends to public and professional domains. While Bahamian women are still underrepresented in political offices, more women receive academic training than men and it is, indeed, "young Bahamian women [who] appear more self-confident and ambitious than their male counterparts" (Bethel, 1993).

Since 1991, when Winford deplored the lack of language and gender studies in the Caribbean, some limited progress has been made, though most studies are to be located squarely in the area of pragmatics and discourse analysis and focus on aspects such as the construction of gendered roles and the (ritual) performance of gender and sexual identity – none of which are central to the the aims of the present study (for a short overview, see Mühleisen and Walicek, 2009, 21-25). Variationist studies of gender-specific language use are almost always linked to questions of variation on the creole-to-standard continuum, and the absence of a clear difference in gender regarding the preference for overtly prestigious forms is often considered indicative of a societal structure "in which gender roles are less polarized than, say, in a white middle class context" (Escure, 1991, 604). When Hackert (2004) analysed rates of standard past inflection across male and female working-class participants in her study of urban BahC, she found that, on average, the effect of gender was negligible. She argued that "while the post-Emancipation period with its increase in personal freedom has created ample opportunity for gender differentiation in general [...], this differentiation may not (yet?) have had linguistic repercussions or may have had them in areas that have not been at the center of sociolinguistic attention" (216). Sidnell (1999, 368-370) also cautioned against the assumption of a one-to-one relationship between linguistic form and social identity. He argued that gender-based differences may show at many different linguistic levels or not at all; and, crucially, gender roles may not "'translate' only into those variables that can be mapped onto a simple standard to nonstandard continuum" (369). Rather, men and women may be "using the creole-to-standard range differently" (370). In his analysis of the use of basilectal and mesolectal pronouns in a rural creole speech community in Guyana, he found that men used the basilectal pronoun *am* more frequently than women. This discrepancy, however, was not simply caused by the women's greater preference for prestigious standard forms. When the referential context was taken into account, an underlying pattern emerged whereby mesolectal marking was preferred for feminine referents and basilectal marking for masculine and neuter/inanimate referents, with female speakers distinguishing these contexts more consistently than male speakers (382-388). Gender-based differences in the Caribbean may, thus, show greater complexity than a simple correlation between gender and overt prestige can capture.

2.3.3.5 Beyond the 'Labovian' social stratification framework

All sociolinguistic studies share the central tenet that language variation is influenced by the social context of speakers. The treatment of social meaning in linguistic variation, however, has been approached in what Eckert (2012) refers to as "three waves of analytical practice" (87). The first wave approach, adopted by pioneering sociolinguists such as William Labov and Peter Trudgill, seeks to establish broad correlations between linguistic variables and major demographic categories like social class, age, gender and ethnicity via large-scale surveys and quantitative analysis methods. The above outline of a number of social variables and their effect on language use in the anglophone Caribbean is largely based on findings of studies in this 'Labovian' variationist paradigm. Subsequent waves have employed ethnographic methods in order to focus on patterns of language use in increasingly more narrowly defined social sub-groups of informants, away from the community and in the direction of the individual and individual agency. Second-wave studies provide a connection between the individual and abstract macrosocial categories by taking into account local social configurations and patterns of interaction. Based on the frequency and quality of interaction between members of a social group, individual network types can be inferred, which, depending on the density and complexity of the network, may have a weak or strong local norm-enforcing power (Eckert, 2012, 91-93). The social-network approach has not been used extensively in sociolinguistic studies in the Caribbean context. A notable exception is Wassink (1999a, 2001), who analysed variation in the Jamaican vowel system(s) in two social networks – one urban-oriented and acrolect-dominant, the other rural-oriented and basilect-dominant. As her study also contributes to the sociophonetic research paradigm in creole speech communities, a very rare commodity, it will be introduced in more detail in section 2.4. Third-wave studies focus on relatively small groups of speakers, defined by their close interaction and shared practices and goals, which can only be determined through detailed in-group knowledge. Variation is seen as constituting "a social semiotic system" (Eckert, 2012, 94), which individual speakers can actively use in order to position themselves in the social landscape and express and negotiate a variety of social concerns. In this approach, the theoretical boundaries between social and stylistic variation become blurred.

One of the limitations of the present study is that its sample of speakers basically consists of isolated individuals or of groups of two or three family members or friends. While the local social context was certainly taken into consideration, seeing as there is no substitute for working close to the ground in determining what social categories are most relevant in a given speech community, this study approaches the concept of sociolinguistic variation in an essentially traditionally variationist, first-wave fashion. The traditional variationist approach has been criticised for its passive view of individual speakers, its use of predetermined social categories, and its principally random way of choosing speakers to represent the established categories (cf. Eckert, 2012). However, these methods also constitute the approach's primary virtues: coverage and replicability. It is encouraging to note that different 'waves' of analytic practice may indeed complement rather than contradict each other. In a sociolinguistic study conducted in Philadelphia, Labov (2001, Ch. 5) combined the analysis of social stratification with the study of social networks and found, in retrospect, “that the one did not replace the other in terms of explanatory value: in fact, they were additive” (Labov, 2006, 133).

2.3.3.6 Functional and stylistic variation

Within sociolinguistics, Labov pioneered the quantitative analysis of style when he organised intra-speaker variation within the setting of the sociolinguistic interview along the dimension of attention to speech (Labov, 2006, first published in 1966). By purposefully manipulating the interview setting and introducing a range of additional tasks, he could distinguish and analyse language use in five different “contextual styles”, ranging from more informal to more formal types of speech: casual speech, recorded outside the official interview or induced by questions that caused participants to become emotionally involved, careful speech, defined as the default type of interview speech, reading passage style, word list style and minimal pair list style (Labov, 2006, 58-86). In this framework, style is considered a dimension of variation separate from but related to the social dimension in that variants used in formal contexts are associated with high social status. This early approach to stylistic variation has been criticised for its relatively narrow focus and later studies would be characterised by increasing attention to other aspects of interactions which may cause a shift in style such as topic and audience members.

In their Harlem study, Labov et al. (1968) recorded not only interview sessions but also peer-group interactions and found that vernacular speech could be elicited more systematically in the latter. The fact that relational aspects between interlocutors matter was explored more thoroughly by Allan Bell and constructed into a theory of style-shifting referred to as audience design (e.g. Bell, 1984, 2001). Audience design is an interactional model of style-shifting, which attempts to account for how “[s]peakers design their style primarily for and in response to their audience” (Bell, 2001, 143). ‘Responsive’ or ‘situational’ style shifts occur when speakers adjust their speech in direct response to changes in the audience, while ‘initiative’ style shifts are creative and demonstrate speaker agency; they are “essentially a redefinition by speakers of their own identity in relation to their audience” (147) and derive their force and direction from association of specific speech patterns with an absent reference group. The framework provided by audience design highlights the link between intra- and inter-speaker variation, as style is considered to derive its meaning from the association of linguistic features with particular social groups: "Variation on the style dimension within the speech of a single speaker derives from and echoes the variation which exists between speakers on the 'social' dimension" (145).

With increasing focus on the dynamic expression of identity and the social constructionist turn in the social sciences in general, speaker agency approaches have become more prominent. According to Deuber (2014, 49-51), two main strands of speaker agency approaches can be distinguished, both of which focus on style as a dynamic, individualised process, where distinctions between stylistic and social variation become fluid: quantitative methods in the third-wave paradigm, where variation is regarded as a form of social practice rather than a reflection of social structure, and qualitative discourse-analytic methods, which focus more closely on how personal identities and relationships are actively contextualised by speakers throughout their interactions. Recent studies on stylistic variation often combine macro- and micro-level analyses, quantitative variationist and qualitative discourse-analytic methods in order to avoid simplificatory views of language and identity (cf. Deuber, 2014, 51-53), acknowledging that "a person is indeed more than a static bundle of sociological categories [but also] more than an ever-shifting kaleidoscope of personas created in and by different situations" (Bell, 2001, 164).

In the Caribbean context, early variationist studies found that there is generally a clear distinction between more informal and more formal styles in interview speech, manifested in the use of more creole and more standard English forms, respectively (cf. Winford, 1991, 575-576). Studies which included peer-group interactions in their analyses usually reported an even higher rate of creole variants in peer-group style than in informal interview style (see e.g. Winford, 1997, 270). These findings show that creole speakers are not located on a single point of the creole continuum but span a whole range of varieties; the actual choice of language use may depend on a number of contextual factors, including the perceived formality of the context and the identity of audience members. Where stylistic variation was correlated with differences in speakers' social status, a general pattern emerged whereby higher-status speakers tended to display more pronounced differences between individual styles than lower-status speakers (Winford, 1991, 576). The difference in the extent of style-shifting, however, was not usually considered to indicate an underlying difference in linguistic choices, but to reflect that higher-status speakers had a much wider range of varieties at their disposal. For example, Patrick (1999b, 269-273), who included Creole-to-English and English-to-Creole translation tasks in his sociolinguistic interview sessions with urban Jamaican Creole speakers, demonstrated that both higher- and lower-status speakers were generally able to approximate creole norms with relatively high precision but only higher-status speakers had sufficient knowledge of English to produce adequate translations into English.

Studies of stylistic variation focussing explicitly on productions by educated, acrolect-dominant speakers have been rare in the literature on Caribbean creoles, though Deuber (2014) has recently contributed a milestone study to the field. She presented detailed quantitative and qualitative analyses of morphological and syntactic variation in upper mesolectal to acrolectal speech in Trinidad and Jamaica, and found that creole forms were generally infrequent but still an important feature of style. Following Allsopp (1996), she distinguished not only between formal and informal speech styles, but recognised an additional 'anti-formal' category, where language use projects conscious familiarity and intimacy, associated with connotations ranging from friendliness and humour to coarseness and vulgarity. Deuber (2014) demonstrated that overt creole forms were associated with anti-formality, while zero forms, i.e. forms that lack overt standard English marking, were also used in informal discourse contexts. When both stylistic connotations and the frequency of different forms within a segment of discourse are taken into consideration, she argued that all creolisms can be positioned on a cline which evokes the familiar notion of a continuum of variation (238-243). Moreover, depending on the discourse context, she found that "both more English and more Creole speech forms can be associated with in-group or with out-group values" (243), and that in the speakers' conceptions of themselves, their 'English' and 'Creole' identities are complementary rather than opposed and incompatible.

2.3.4 Phonological versus grammatical variation

In the North American context, phonological and grammatical variation patterns are often said to differ in that the former display primarily 'fine' or 'gradient' and the latter 'sharp' social stratification. Labov introduced the terms in 1966 as an empirical problem, which might shed light on the question of whether class divisions reflected in language use are dichotomous or continuous, and whether some class divisions are more meaningful than others:

> If we think of class as a rigid series of categories, in which the marginal cases are rare or insignificant, then a proof of class correlation with language would require equally discrete categories of linguistic behavior (in our terminology, *sharp stratification*). [...] If, on the other hand, we think of class as a continuous network of social and economic factors, in which every case is marginal to the next one, we would expect that language would also show a continuous range of values, and the number of intermediate points of correlation would be limited only by the consistency and reliability of the data (in our terminology, *fine stratification*). [...] It is clear that class and language relationships will be somewhere between these two extremes. [...] The cutting points where the linguistic evidence shows the greatest internal agreement will be indicated as the most natural divisions of the class continuum – to the extent that language is a measure of class behavior. (Labov, 2006, 148-149)

In his quantitative analysis of data from New York City, he found both kinds of stratification and concluded that continuous and discrete patterns of sociolinguistic variation may exist simultaneously within the same speech community. In subsequent research, an interesting pattern emerged: Stable sociolinguistic variables, defined primarily with recourse to the standard-to-nonstandard continuum of English, tend to show relatively sharp stratification, whereas linguistic features undergoing change are often finely stratified. Wolfram and Schilling-Estes (2006) partly attributed these differences in alignment between linguistic and social variables to the role that social class plays in language change within the community, since change tends to start in a given class and gradually spreads from that point to adjacent classes (176-177). Guy (2011) emphasised that, as the use of linguistic features changes, so does their social meaning; the strict social evaluation of these features, however, may require time to develop:

> Newly emerging variables might separate people finely according to their social status, but when the dust settles after the long haul, sharp and fundamental class divisions emerge. The long-established form acquires a firm, even indexical, class identity, while the new form may be merely trendy. (Guy, 2011, 165)

The degree to which linguistic variables are socially diagnostic in a given speech community may also underly the association of fine stratification with phonological variables and sharp stratification with grammatical variables in the North American context. Broadly speaking, phonological variables tend to vary regionally, while grammatical variables vary socially. Pronunciation differences are more apt to delimitate dialect regions (cf. Labov et al., 2006) than to function as global symbols of social differences in American society. Standard American English pronunciation, traditionally referred to as General American, is usually characterised negatively as what is left after speakers suppress salient regional and social features. Crucially, however, as Kretzschmar, Jr. (2004) noted, "[d]ecisions about which features are perceived to be salient will be different in every region" (262), which results in "a relative level of quality [...] that varies from place to place" (263). Phonological features used by educated, high-status speakers in a given region may be noticeable to outsiders, and sometimes they may even be stigmatised to these outsiders, but within their respective speech communities, these regionally coloured features are considered standard. Phonological variables, thus, show a great deal of flexibility in North American English; they are viewed as widely acceptable manifestations of regional identity, which may be "particularly true in the case of vowel differences" (Wolfram, 2004, 72), and, consequently, do not usually show sharp social stratification. In contrast, grammatical variables are typically more diagnostic of social differences. Presumably due to their close association with educational achievement, distinctions between grammatical variants can be captured with reference to a standard/nonstandard dichotomy, and their particular social evaluation tends to extend beyond regional boundaries. As grammatical variables are ascribed a major symbolic role in distinguishing sociolects in American society, they often display sharp stratification across different social classes (e.g. Wolfram, 2004, 69-72).

The association of different kinds of social stratification with phonological and grammatical variables is not a pattern that is universal to all societies in which English is spoken. In the United Kingdom, for example, sharp social stratification is found in both phonological and grammatical variables (see e.g. analyses in Trudgill, 1974). This is often attributed to the fact that the system of class distinctions used to be quite rigid, at least up to the 1970s (e.g. Tagliamonte, 2012, 26). The social importance of phonetic and phonological features is also reflected in the still very prominent national as well as international position of Received Pronunciation (RP), the British English pronunciation standard. The predecessor of RP originated in the south-east of England, where it was associated with the social elite, but the more it was used as an instrument of social exclusion throughout the 18th and 19th centuries, the more it became characterised as an essentially non-regional accent – devoid of any localisable speech patterns prevalent among the lower classes (Hickey, 2012, 5-7). In 1908, Henry Sweet described the relation between standard English, educated language use and the absence of regional features as follows:

> Standard English [...] is now a class-dialect more than a local dialect: it is the language of the educated all over Great Britain. [...] The best speakers of Standard English are those whose pronunciation, and language generally, least betrays their locality (Sweet, 1908, 7).

Throughout the 20th century, the relationship between social and regional accent variation in Britain has often been modelled as having the form of an equilateral triangle. The base of the triangle is broad, implying a considerable amount of phonological variation between the different regional accents spoken by the lower social classes. Going upwards from the base, the increasing narrowness of the triangle implies decreasing regional variation between the accents of speakers higher up the social scale. To a certain extent, the model may also apply to language use in native varieties of English outside Britain, notably in Ireland and the southern hemisphere, where RP functions implicitly as an exonormative standard accent. In the last few decades, there have been some changes in the sociolinguistic situation of RP, as attitudes towards non-standard accents have become somewhat more liberal. Nevertheless, "the younger generations of those sections of the community one would expect to be RP speakers still are RP speakers" (Trudgill, 2002, 177), and while RP may undergo processes of change as all language varieties do, there is no compelling linguistic reason to assume that RP will 'die' or become increasingly diluted with regional features any time soon (Trudgill, 2002, 173-180).

From the available literature on phonological variation in Caribbean Englishes and creoles, not much substantial information can be derived about the social distribution of phonological as opposed to grammatical variables. On reviewing the contributions to *A Handbook of Varieties of English (Vol. 1)*, which provide a rough outline of the phonologies of world-wide varieties of English, Schneider (2004b) argued that no fundamental distinction should be drawn between dialectal and creole varieties of English in the absence of empirical evidence and that, at least in the

American context, such a division "would seem to be even less called for on the level of phonetics and phonology than on the level of morphosyntax" (1075). Childs and Wolfram (2004), who provided an article on Bahamian English phonology, maintained a similar position and claimed that though Bahamian varieties are characterised by the presence of a basilectal-acrolectal continuum with respect to creole features, this dimension of variation was set aside in their discussion as it "tends to be more relevant to the grammatical description of BahE than to phonology" (438). While these assertions are not based on rigorous linguistic evidence, they provide a starting point for the discussion of how phonological variation might relate to grammatical variation in the context of Caribbean creole speech communities. If the phonologies of American creoles cannot in general be distinguished from those of dialectal varieties, and if the kind of sociolinguistic variation that is captured in the creole continuum model does not apply to the level of phonetics and phonology, then phonological variation in American creoles may indeed resemble that of American dialectal varieties and show primarily fine social stratification.

The observation that some linguistic variables seem to make more of a difference on the creole-to-standard scale of variation has been an issue since the construction of implicational scales – indeed, this is precisely what the ordering of variables in an implicational scale indicates: Some features are more distinctively 'creole' than others and can be used to predict the occurrence other creole features. Bailey (1971) attempted to define dialect boundaries in Jamaican Creole and suggested that different weights should be assigned to lexical, phonological, morphological and syntactic variables. She also argued that morphosyntactic variables distinguish the varieties on the creole continuum more clearly than phonological variables: The same phonological variants tend to be used by speakers across the continuum, which is reflected in the position of phonological variables on the less markedly basilectal columns in most implicational scales (see e.g. DeCamp, 1971b, 355)

To some extent, this hypothesis also seems to be supported from a variationist perspective. Rickford (1987) investigated the social and stylistic variation of selected phonological and morphosyntactic variables in a basilectal/mesolectal Guyanese Creole speech community. He found that while speakers of higher and lower social status showed qualitative differences in their use of morphosyntactic features, they shared a range of non-standard or (basilectal) creole phonological features such as h-dropping, r-lessness, consonant cluster reduction, vowel-laxing and th-stopping.

He concluded that "phonological variables in the creole continuum show gradient rather than sharp stratification, and are therefore more amenable to unified analysis in which different classes within a community are assumed to share common underlying forms" (168). However, he also found that the existence of stigmatised, highly marked phonological variants complicate the distinction between the different patterns of social distribution of grammatical and phonological variables. He identified the "broad-mouth pronunciation" of standard English [ɔː], [ɒ], [ɔi] as low and unrounded [aa], [a], [ai] as "the single most important phonological variable in the [Guyanese Creole] continuum" (168) in terms of social distinctiveness. In Rickford's data, 'broad-mouth' showed to be a true marker of creole speech, consistently separating basilectal from mesolectal speakers.

Patrick (1999b) analysed both phonological and grammatical variables in the urban Jamaican Creole mesolect and found that "[i]t is striking how closely the linguistic rankings cohere" (288) in terms of a creole-to-standard scale: Speakers who rank lower or higher in their use of standard variants for one variable also do so for the other variables, irrespective of the linguistic level of variation. Among the phonological variables, he observed both fine and sharp patterns of social stratification. The linguistic variable (TD), which refers to word-final /t,d/ deletion, showed "a smooth progression across the sample, with fine stratification" (280); only quantitative distinctions separated one speaker from then next and even speakers whose use of prestige patterns generally predominated displayed a deletion rate of over 50% (270). In contrast, (KYA) in AR word-classes, which refers to the variable insertion of a palatal glide after velars in words like *card* or *garden*, was categorically absent in the speech of higher-status speakers, displaying an "entirely discontinuous, non-gradient pattern" (279). Patrick (1999b), similar to Rickford (1987), argued that this indicates that (KYA) in these contexts is highly stigmatised, and, thus, differs in its social distribution from other, presumably less stigmatised, phonological variables.

Some indications that the nature and shape of phonological variation may differ from grammatical variation in Caribbean creole contexts comes from quantitative studies which focus on speech productions by acrolect-dominant speakers. In acrolectal speech, overt morphological and morphosyntactic creole forms tend to be rare (e.g. Gut, 2011; Deuber, 2014), which indicates that these variables are characterised by a social distribution which systematically separates speakers of lower from speakers of higher social status, i.e. they are sharply stratified. However, the same is not necessarily the case for phonological variables. Irvine (2004, 2008) analysed the distribution of a number of phonological variables in the speech of highly educated Jamaicans in a formal, professional context and found that there are only very few phonological features which the acrolect does not share with other Jamaican varieties. What distinguishes acrolectal speech is the frequency with which certain features are used and, in particular, the very low rate of stigmatised, allegedly creole, items.

Gut (2011) offered an explanation for this discrepancy, suggesting that "Creole influence [might show] differently on different linguistic levels" (100). In acrolectal speech, creole influence may be restricted to the area of phonology, because English pronunciation is usually less emphasised in the classroom than grammar and it cannot be drawn from written texts, which introduce many creole speakers to English. As a consequence, "the norm-orientation for English phonology and English grammar" (101) may differ in acrolectal speech, where grammatical deviations from exonormative standard models are considered mistakes but a certain amount of local features are acceptable in pronunciation. Irvine (2004, 67) pointed out that, in principle, this situation is no different from that of other established as well as emerging standards of English around the world. Grammatical systems are characterised by considerable uniformity, presumably because they are a construct anchored in writing, while pronunciation is what distinguishes educated speech from different locales. Irvine also strongly argued against treating the Jamaican acrolect as an essentially non-native variety; assumptions about its phonology should not be based on comparisons with some foreign model, as "Jamaican English is, after all, a national variety [...] in its own right" (71).

In this spirit, Irvine (2008) tackled the question why many non-standard phonological features seem to be acceptable in even formal acrolectal speech, while others tend to be avoided to varying degrees, and how this can be reconciled with language attitude studies which report that accent is perceived as an important aspect distinguishing creole from English (Wassink, 1999b, 66; Mühleisen, 2001, 51). She argued that the highly asymmetrical pattern of frequencies with which standard and non-standard phonological variants are used by acrolectal speakers indicates that "the architecture of sociolinguistic variation" (19) is characterised by the effect of *load-bearing* as well as *non-load-bearing* variables. Load-bearing variables are those crucial to defining the variety being used, whether creole or English. Because load-bearing variables are indexical of variety, the use of variants will be focussed and normalised, and "social differentiation is going to be more starkly signalled by use of these variables" (20), reflected in relatively sharp social stratification. In contrast, non-load-bearing variables are not essential to a given variety but merely "serve to give the structure its character" (19), signalling Jamaican identity. Their distribution will be less focussed, which may show in relatively fine social stratification.

Though most of the studies outlined above are based on language data from Jamaica, it seems that a simple equation of phonology equals fine and grammar equals sharp social stratification is unlikely to apply in the Bahamian context. It may be expected that some socially variable phonological structures are more socially diagnostic than others, whether this is attributed to the stigmatisation of associated creole variants or to the variables' load-bearing qualities in indexing creole or English speech targets. Other phonological variables are more likely to be characterised by fine social stratification, as, presumably, similar to the North American context in general, non-standard variants of these variables are only truly perceived as non-standard by the outsider.

2.4 Creole phonology

An investigation of synchronic variation in the Bahamian vowel system(s) cannot proceed without a firm grasp of the sociohistorical development of the varieties involved and an understanding of the social forces likely to influence contemporary social and stylistic variation patterns. These issues have been addressed in the previous sections. The present section now turns to a discussion of creole phonology and, more specifically, of vowels and vowel systems in the Caribbean and in the Bahamas. Due to the discipline's traditional focus on creole genesis as reflected in the grammar of creoles, in-depth studies of creole phonetics and phonology have been relatively rare, whether from a typological perspective or with regard to individual varieties. Sections 2.4.1 and 2.4.2 will focus primarily on what is known about the phonologies and vowel systems of Caribbean creoles collectively: Section 2.4.1 will show why it is a great challenge to reconstruct the phonological development of creole languages and tease apart substrate, superstrate and universal patterns, and section 2.4.2 will introduce some general characteristics that are shared among Caribbean English-lexifier creoles. The present study seeks to provide an acoustic characterisation of variation in the BahC vowel system, which relies heavily on established frameworks for the comparison of vowel qualities and on acoustic analysis methods. These will be described briefly in section 2.4.3, followed by an overview of previous acoustic studies of Caribbean creole vowels in section 2.4.4. Section 2.4.5, finally, will turn to a discussion of the lexical incidence of Bahamian vowels and proposed BahC vowel systems.

2.4.1 Origin of creole phonologies

Much of creolist research in the past decades has focused on creole genesis and the identity of creole languages as linguistic systems in their own right. Shaped in language contact situations, varying degrees of influence have been attributed to superstrate and substrate forces, processes of group second language acquisition, and language universals, depending on the mix of social factors and the type of linguistic input at the time of emergence (see e.g. Holm, 2004, 58-67; Winford, 2007, 314-352). Of particular interest has been to uncover the Caribbean creoles' donor varieties, their African roots and the 17th- and 18th-century non-creolised varieties that have contributed to their formation.

2.4.1.1 Substrate influence

While the importance of substrate influence to the formation of creole phonology has never been seriously challenged, the claim that a creole language reflects features of a particular source language requires substantial linguistic as well as historical evidence. African lexical contributions have been established for several Caribbean creoles, including BahC (Holm, 1980; Shilling, 1981; Holm and Shilling, 1982), but this does not necessarily imply that the respective African languages have crucially influenced the creoles' structure during their formative stages (see e.g. Smith, 2008, 99-100, who argues for later adstrate influence on Gullah). Also, the reverse cannot be postulated a priori either: that African languages for which no cognates have been found in respective creoles did not have a significant impact on the creoles' structural properties.

BahC shares a subset of words of disparate African origins with most of the other English-lexifier but not with French- or Portuguese-lexifier Caribbean creoles. Collectively referred to as *Ingredient X*, a term coined by Smith (1997), these lexical items suggest a common mediating source. While disagreement persists on whether this mediating force was a stabilised pidgin or a fully-fledged creole, its origin has been traced to Barbados (Smith, 1997), from where it is assumed to have subsequently spread to other Caribbean territories. Thus, rather than linking the Bahamas directly with Africa, the lexicon contains evidence of shared input to all English-lexifier Caribbean creoles, which further compounds any attempts at attributing certain phonological features to the influence of specific African languages. As Smith (2008, 101-102) noted, even vague references to West African or Kwa language family influence should only be made with caution. Kwa languages may be typologically similar, but they are certainly not identical. Moreover, some characteristics of Kwa languages are shared by English, so that certain features might just as likely be adduced to superstate influence.

2.4.1.2 Superstrate influence

While it is clear that creoles owe many aspects of their phonological systems to their superstrate sources, locating concrete contributions can be almost as problematic as with substrate influences. In creole settings, there is less continuity between

English and the derived contact language than in other post-colonial contexts which resulted in the emergence of a non-creolised regional variety of English. The latter are essentially products of 'ordinary' language change and their features can be described as reflexes of the features that preceded them. Creoles, however, are considered languages in their own right, with linguistic systems that differ from those of all input languages, and it is unclear in how far it is still meaningful to speak of (English) reflexes in these situations (Holm, 2004, 137). A further complication presents itself regarding the choice of early English dialects to which a given creole should be related – using contemporary standard English phonology as a point of comparison is usually considered inappropriate [3].

Tracing the regional provenance of 2500 Bahamian expressions not currently used in standard British or American English, Holm (1980) assigned 43% of the regionalisms to Scotland and Northcountry, with another 25% from Ireland and Westcountry. While 18th-century settlement patterns seem to support the view that Scottish and Northern English varieties predominated in the Bahamas at the time of language contact, conclusive historical evidence remains to be established (Hackert, 2004, 8).

2.4.1.3 Group second language acquisition and language universals

According to Winford (2007), creole phonology appears to be the result of "varying degrees of reinterpretation of superstrate phonology in terms of substrate phonetic categories and phonological rules" (319). This view invokes theories of second language acquisition (SLA), specifically of the acquisition of new phonologies, in which it is posited that the ability to perceive certain contrasts in the target language is confounded by automatic selective perceptual processes the learner has already acquired in a first language. Much work in SLA rests on the notion of similarity and contrast between a learner's first (L1) and second (L2) language and seeks to predict the occurrence of *transfer*, which in the narrow sense can be defined as "the mental processes in individual speakers that occur when features of one language influence features of another language present in the speaker's mind" (Plag, 2009,

[3]Smith (1997, 118-119), however, argued that standard Early Modern English was the most influential superstrate dialect in post-colonial contexts in general, as the majority of migrants from the British Isles must have had at least some knowledge of the standard.

123). Flege's (1995) *Speech Learning Model*, for example, posits an explicit mechanism for the mapping of phonetic categories in L1 and L2 by the learner, which involves an equivalence classification procedure: L2 segments which are similar to L1 phonetic categories are mapped onto these already existing categories, and non-native phonological representation then leads to non-native-like production.

While the idea that processes of SLA are relevant for an account of creolisation is not new, Plag (2009) has recently taken it upon himself to revisit the issue and to provide evidence for his hypothesis that "creoles originate as conventionalized interlanguages of an early developmental stage" (121). With respect to creole phonology, he concluded that "the make-up of creole inventories bears witness of developments that are typical of L2 acquisition, most prominently the conflation of phonological categories and the emergence of unmarked structure" (134), although some phenomena remain that are not as easily accommodated by an SLA-based approach. In SLA terminology, the 'conflation of phonological categories' may be considered instances of negative transfer from the learners' first i.e. substrate languages. The 'emergence of unmarked structure' refers to the notion that speakers of interlanguages, in this case speakers of (early) creoles, perform better on and are more likely to adopt less marked structures, irrespective of whether they were originally L1 or L2 structures or, possibly, neither L1 nor L2. Transfer and universal markedness patterns are known to interact in intricate ways – in this respect, SLA research is similar to pidgin and creole studies, where an analogous substrate influence versus language universals debate has dominated the discussion for decades. In the field of SLA, recent optimality-theoretic approaches provide sophisticated means to model the re-ranking of constraints in light of universal hierarchies of markedness, but they are based on explicit assumptions about the initial state of the learner, i.e. his or her L1 constraint ranking, and are thus of only limited value to the study of the development of creoles (Plag, 2009, 124). As long as we do not know the exact identity of input languages in situations of creole formation, we can only rely on conventional wisdom, partly derived from SLA research (cf. e.g. Holm, 2004, 137-139): Creole language features reflect the influence of superstrate, substrate and adstrate languages, universals of L2 acquisition and independent innovation. It is difficult to determine whence a particular phonological feature came, because of the frequent convergence of all or some of these processes. Contact languages are often said to retain features common to their source languages, but phonetic realisations follow primarily the rules of substrate languages. Substrate languages may also contribute phonemes to the newly formed creole, but the likelihood of the adoption of such features is greatest when both substrate influence and universal tendencies converge.

2.4.2 General characteristics of Caribbean creole vowel systems

As Smith (2008) stated, "[t]here is little point in indulging in a general discussion of the phonological systems of creole languages, as they do not form any kind of unique type" (103). While this notion is to some extent disputed by linguists who propose that creole languages may form a distinct typological class and that there are specific typological characteristics which reliably set off the class of creole language from non-creole languages, concrete evidence of this view is scarce. McWhorter (2001), for instance, claimed that "[t]he world's simplest grammars are creole grammars" (125). Due to their relatively young age, he argued, creole languages lack the complexity of older, non-creole languages, which is only acquired through time. McWhorter proposed to compare languages' phonological and grammatical systems and subsystems in terms of both the absolute number of oppositions and the relative markedness of individual units, and he predicted that "in the final analysis, there would be a healthy band of languages beginning at the 'simplicity' pole which would all be creoles" (162). Klein (2011) set out to test what he referred to as, the "creole simplicity hypothesis" (157) with regard to the size of phoneme inventories, the size of vowel quality inventories, the number of stop consonant series and the number of attested syllable types. He created a database containing 32 creole languages, balanced where possible by geographical region and lexifier, and found that, with respect to the measures applied, creoles did not cluster toward the simpler pole; if anything, creoles appeared to cluster toward the typological middle – their phoneme and syllable inventories were more average in size than those of non-creole languages. In his analysis of vowel quality inventories [4], Klein (2011, 166-169) even found that, on average, creoles tend to exhibit a larger number of contrasts than non-creoles. These findings indicate that creole vowel inventories cannot be considered small in relation to that of non-creole languages in general. However, as was noted in the

[4]Following Maddieson (2013), Klein (2011) recorded vowel length contrasts as phonemic only if they were accompanied by vowel quality differences.

previous section, during creolisation speakers tend to adopt those segments which are shared in the input languages or to map L2 sounds perceived to be similar onto already existing L1 categories. Since English has a comparatively large vowel inventory whereas West African languages have predominantly five- or seven-vowel systems, many Atlantic English-lexifier creoles may still have fewer vowel phonemes than English.

While it is difficult to view creole phonologies as a coherent field of study due to the extensive variation among creoles, the subset of Caribbean English-lexifier creoles does share a number of general characteristics. They typically lack a front/back distinction in low vowels, they rarely have mid-central vowels, the distinction between tense/lax vowel pairs is said to depend more heavily on vowel length than in metropolitan varieties of English, and there is a tendency towards monophthongal realisations of phonemes which are produced as narrow diphthongs in metropolitan standard Englishes (see relevant contributions in Schneider et al., 2004). These features are usually considered to reflect the common origin and shared sociohistory of Caribbean creoles rather than merely their identity as creole languages.

Alleyne (1980) characterised "Afro-American", the earliest form of New World creole, as a variety with a four-tiered seven-vowel system as illustrated in figure 2.5. The mid vowels [ɛ] and [ɔ] are described as having a relatively low functional load, which presumably reflects their status as allophonic variants of /e/ and /o/ in a number of African languages (Alleyne, 1980, 39-41; Holm, 2004, 145-146)

i u

e o

ɛ ɔ

a

Figure 2.5: Four-tiered vowel system of Afro-American (Alleyne, 1980, 38, 76)

In addition to the absence of a productive tense/lax distinction, Alleyne (1980) argued that the emerging vowel system initially also lacked systematic vowel length distinctions. Long vowels in English "were interpreted as nuclei of neutral length" (39), which would have resulted in a lack of contrast between long/short pairs such as *beat* and *bit*. Most Caribbean creoles have coexisted with English for centuries and, according to Alleyne (1980, 38-43), it was due to the sustained influence of English that vowels eventually acquired long counterparts. However, Carter (1993) disagreed and argued that variability in vowel length was characteristic of Caribbean creoles from the beginning, deriving from competing West African subsystems. She also suggested that the distinction between long/short vowel pairs in some Caribbean creoles may not be attributed to vowel length per se, but rather to the doubling or rearticulation of vowels as it occurs in many African substrate languages. In any case, both authors implied that the difference in length between resulting long/short vowel pairs may not have been accompanied by differentiation in vowel quality, at least not to the same extent as it is usually the case in British or American English; more generally, however, opinions tend to diverge on this issue (see e.g. discussion in Rickford, 1993, 355-356). The hypothesis that distinctive vowel length was initially interpreted as a distinction between single and double vowels resembles another claim often made about early Caribbean creole vowels: As vowel sequences in many West African languages are better treated as two elements, since they can carry different tones, diphthongs are claimed to have been added only later to Caribbean vowel inventories (e.g. Holm, 2004, 148). At present, research on the synchronic nature of Caribbean creole vowel systems is still scarce, though some inroads have been made with respect to varieties spoken in Jamaica (e.g. Patrick, 1999b; Wassink, 1999a, 2001; Irvine, 2008). The results of individual studies which involve the acoustic analysis of vowels in North American and Caribbean creole languages will be further discussed below (see section 2.4.4).

2.4.3 Sociophonetics and the analysis of vowels

In sociolinguistics, the examination of phonological variables and their distribution with respect to language-internal and -external factors has a long tradition (e.g. Labov, 2006; Trudgill, 1974). Many studies have also investigated the phonetic quality of phonological variants, but they vary considerably in the amount of phonetic detail. Impressionistic, auditory analysis has long been the standard method for the description of vowels and vowel inventories, but more recently, due to the increased availability of high-quality recording devices and software packages for the acoustic analysis of sound waves, instrumental, acoustic techniques have become more common. Section 2.4.3.1 below will focus briefly on the auditory method in order to introduce two commonly used frameworks: one for the description of vowel quality (the IPA vowel chart) and another for the comparison of vowel inventories and lexical incidence across different varieties of English (John Wells' standard lexical sets). Both of these frameworks provide important anchoring points for the present study. Section 2.4.3.2 will then introduce how perceived vowel quality is represented in the speech signal and can, thus, be described using acoustic analysis methods.

2.4.3.1 Important frameworks for the sociolinguistic analysis of vowels

The typical procedure in the auditory analysis of vowels is to listen repeatedly to recordings of speech and to transcribe the perceived vowel segments using the symbols provided by the International Phonetic Alphabet (IPA). The IPA was first issued by the International Phonetic Association in 1886 and has since then undergone several revisions, the last one completed in 2005 [5]. According to the *Handbook of the International Phonetic Association* (1999), vowels can be defined as "sounds which occur at syllable centres, and which, because they involve less extreme narrowing of the vowel tract than consonants, cannot easily be described in terms of a 'place of articulation' as consonants can" (10). Instead, vowel sounds are classified in terms of an abstract, quasi-articulatory space model, derived from Daniel Jones' work on Cardinal vowels and variously referred to as the vowel quadrilateral, the vowel trapezium or, simply, the vowel chart.

Similar to the cardinal points of a compass, Cardinal vowels were intended to serve as standard reference points, representing the universal limits of vocalic articulation with respect to tongue position and lip posture (see figure 2.6, left). Two primary Cardinal vowels, C1 and C5, were defined by articulatory means, their positions constrained by the constriction which would be created if articulatory gestures were any more extreme in the high/low and front/back dimensions. All other primary Cardinal vowels were positioned at intermediate, auditorily equidistant steps along the margins of the vowel space. C1 through C5 are produced with the lips spread or neutral, while C6 through C8 require rounded and increasingly protruded lips. The set of primary Cardinal vowels was accompanied by a set of secondary Cardinal vowels, occupying the exact same positions with reverse lip postures (Clark,

[5] A new chart with minor layout changes was published in 2015.

Yallop and Fletcher 2007: 24; Jones Outline 1962: 31-32). In an attempt to retain more articulatory information in the model, Jones initially made use of a sloping-top trapezoid, reflecting the greater distance between front vowels, which he only later abandoned for a simplified version with parallel top and bottom and right angles at top and bottom back – the version adopted by the IPA (see figure 2.6, right). In addition to the Cardinal vowels, the IPA vowel chart offers symbols for mid central vowels and for a number of intermediate locations.

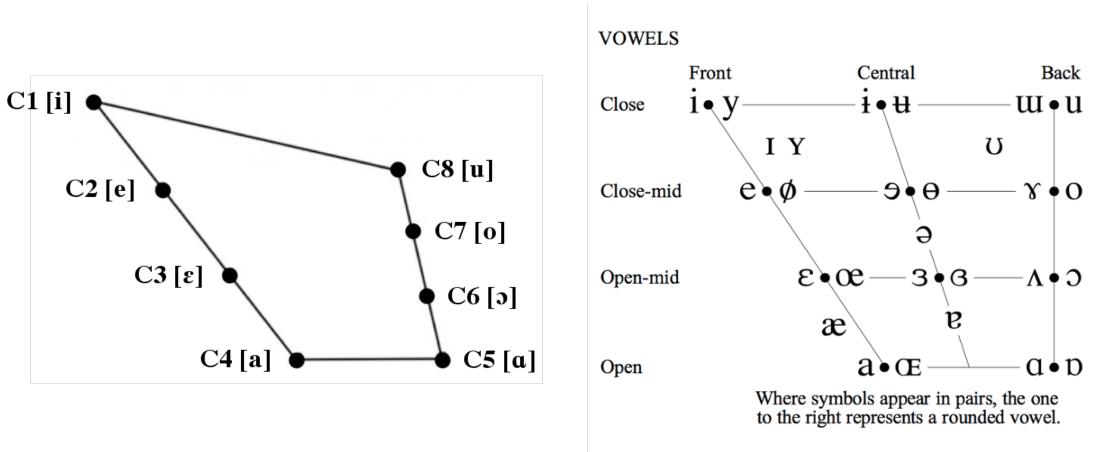

Figure 2.6: Left: Primary Cardinal vowels after Jones (1962); right: The current IPA vowel chart (International Phonetic Association, 2015)

Today, it is customary to describe vowel quality with respect to the three dimensions represented in the vowel chart: vowel/tongue height, vowel/tongue position/frontness and vowel roundedness (or: lip rounding). There remains some disagreement as to whether those labels, which still reflect the quasi-articulatory origin of the model, should be interpreted in a cautiously proprioceptive-tactile way, or whether any direct association with articulatory configurations should best be avoided in favour of a strict and exclusive auditory reading (Lindblad, 2001, 106). While it is indisputable that the acoustic output during vowel production is mainly governed by the size and shape of the air passage above the larynx, which, in turn, can be modified by articulatory gestures, it is by no means clear which aspects of articulatory position, if any, are the most reliable indicators of vowel quality. Even the earliest X-ray studies of tongue position showed that the correspondence between the location of vowels in the vowel chart and the highest point of the tongue are rough at best (see figure 9.3 in Ladefoged, 2001, 203). The primary function of the vowel symbols provided by the IPA vowel chart is to serve as reference values for phoneticians and phonologists. As neither vowel production nor vowel perception is absolute and differences between vowel qualities are gradual, there obviously remains a subjective factor in any auditory analysis. Agreement between different transcribers tends to be low to satisfactory, depending on the amount of training and transcribing conditions (e.g. Gut and Bayerl, 2004).

It was and in some cases still is common practice to describe the vowel inventories of different accents of English by comparing them to either Received Pronunciation (RP) or General American (GenAm). Wells (1982) devised a more convenient and democratic reference system which allows the mapping of vowels to a common set of keywords, each representing a large group of words, the so-called *standard lexical sets*. Wells explains as follows:

> [The standard lexical sets] enable one to refer concisely to large groups of words which tend to share the same vowel, and to the vowel which they share. They are based on the vowel correspondences which apply between British Received Pronunciation and (a variety of) General American, and make use of keywords intended to be unmistakable no matter what accent one says them in. Thus 'the KIT words' refers to 'ship, bridge, milk . . . '; 'the KIT vowel' refers to the vowel these words have (in most accents, /ɪ/); both may just be referred to as KIT. (Wells, 1982, xviii)

The full list of standard lexical sets for vowels in stressed or potentially stressed syllables is given below in table 2.2, along with their corresponding vowel phonemes in RP and GenAm.

Table 2.2: The standard lexical sets; reproduced from Wells (1982, xviii-xix, 123)

	Keyword	RP	GenAm		Keyword	RP	GenAm
1.	KIT	ɪ	ɪ	13.	THOUGHT	ɔː	ɔ
2.	DRESS	e	ɛ	14.	GOAT	əʊ	o
3.	TRAP	æ	æ	15.	GOOSE	uː	u
4.	LOT	ɒ	ɑ	16.	PRICE	aɪ	aɪ
5.	STRUT	ʌ	ʌ	17.	CHOICE	ɔɪ	ɔɪ
6.	FOOT	ʊ	ʊ	18.	MOUTH	aʊ	aʊ
7.	BATH	ɑː	æ	19.	NEAR	ɪə	ɪ(r)
8.	CLOTH	ɒ	ɔ	20.	SQUARE	ɛə	ɛ(r)
9.	NURSE	ɜː	ɜr	21.	START	ɑː	ɑ(r)
10.	FLEECE	iː	i	22.	NORTH	ɔː	ɔ(r)
11.	FACE	eɪ	eɪ	23.	FORCE	ɔː	o(r)
12.	PALM	ɑː	ɑ	24.	CURE	ʊə	ʊ(r)

2.4.3.2 Acoustic analysis of vowel quality

Labov et al. (1972) marked the beginning of acoustic analysis methods in the study of dialect variation. This study showed that spectrographic analysis readily illuminates fine-grained differentiation of dialectal vowel quality variants, and that conversational speech is, in principle, suitable to large-scale acoustic analysis. This section is intended as a brief introduction to the acoustic correlates of vowel quality; it outlines what an acoustic analysis of vowel quality entails and how the results can be interpreted. For more detailed, accessible introductions to the acoustic analysis of speech and speech acoustics see, for example, Harrington and Cassidy (1999) and Kent and Read (2002). Di Paolo and Yaeger-Dror (2011) and Thomas (2011) provide introductions to the field of sociophonetics.

All sound results from vibration of one kind or another. Acoustic speech signals are formed when vocal organs move, causing a pattern of disturbance in the air particles that is propagated outwards and through space, much like ripples on a pond. The acoustic behaviour and properties of the vocal tract during vowel production are generally considered in terms of a linear source-filter model, which proposes that "the excitation signal of the source can be modeled as independent from the filter characteristics of the vocal tract" (Harrington, 2013, 81). The vibrating vocal folds of the larynx act as an efficient source of sound. They create a complex quasi-periodic sound wave, whose power spectrum contains all harmonics at multiple integers of the fundamental frequency (F0), which itself depends on the rate of vocal fold vibration. The sound wave subsequently passes through the supralaryngeal vocal tract, where it is modified by the resonating characteristics of the nasal, oral and pharyngeal cavities, which function as a frequency filter: Some frequencies are enhances, while others are dampened. As the position of articulators changes the size and shape of the oral cavity, this in turn modifies the resonating properties of the vocal tract. The resonance frequencies of a given vocal tract shape are known as *formants*, and they are the most important acoustic cue to vowel quality (e.g. Harrington and Cassidy, 1999, 30-33).

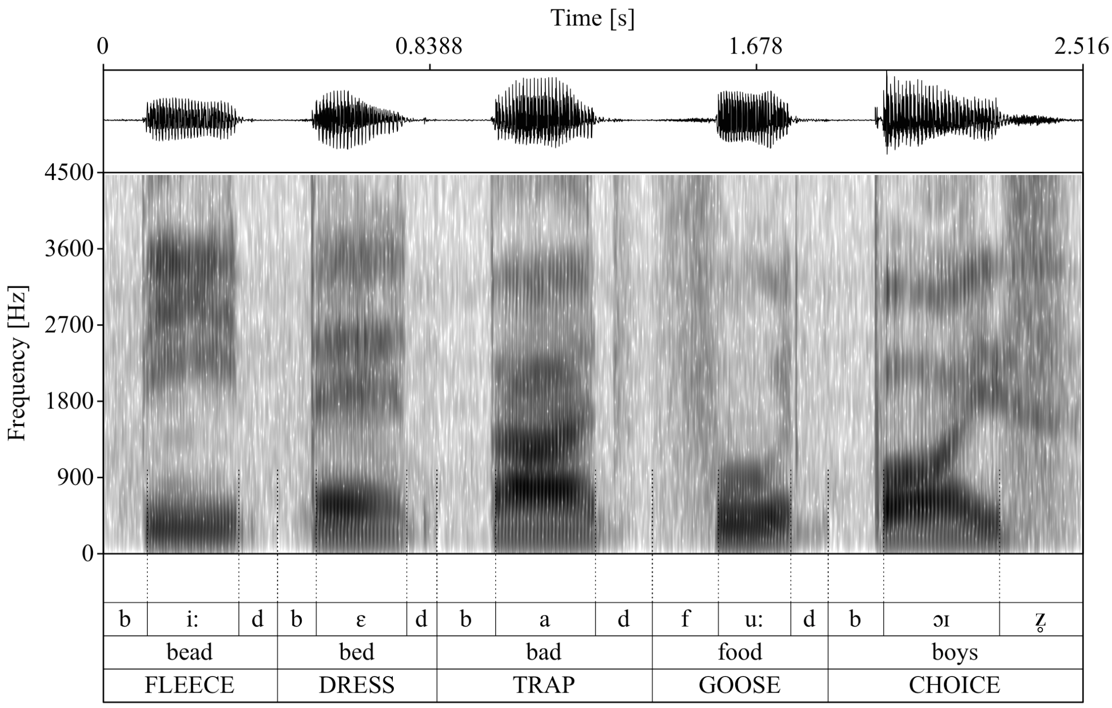

Figure 2.7: Wave form and spectrogram for five words uttered in isolation by a participant of this study (Ben03)

Formants are clearly visible as dark horizontal bands in a spectrographic display (see figure 2.7) provided by speech analysis software packages such as Praat (Boersma and Weenik, 2009) or EMU-webApp (Winkelmann and Raess, 2014), which also offer automatic formant frequency estimation methods. For the differentiation of vowels, it is usually sufficient to refer to the first two formants F1 and F2. In a number of early studies, it was demonstrated that F1 and F2 correlate with the descriptive dimensions of the vowel quadrilateral: F1 is inversely proportional to vowel height, and F2 increases with vowel frontness (Harrington and Cassidy, 1999). The F1 × F2 plane has since become one of the standard ways of illustrating and comparing vowel qualities (see e.g. Thomas, 2001; Labov et al., 2006). Figure 2.8 is an example of such a representation; it displays the mean F1 and F2 frequencies of all primary and secondary Cardinal vowels as produced by Daniel Jones. As can be gleaned from the positional difference between rounded (red) and unrounded (blue) counterparts, formants are also influenced by the presence of lip-rounding, lowering their frequencies especially in the F2 (and F3) dimension.

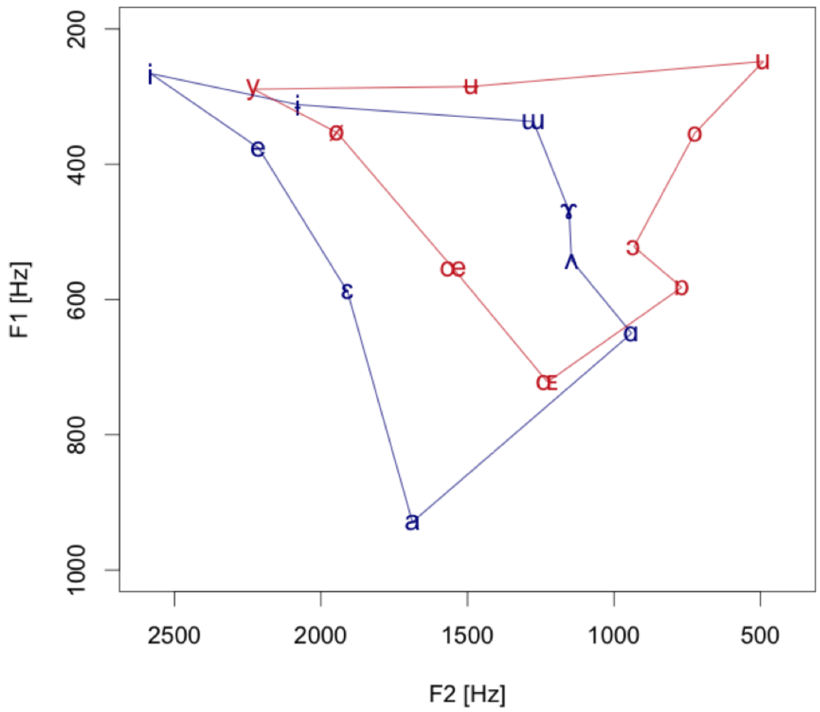

Figure 2.8: Mean F1 and F2 frequency values of rounded (red) and unrounded (blue) Cardinal vowels as uttered by Daniel Jones; adapted from Thomas (2011, 146)

Before formants can be estimated, a decision has to be made concerning where, at what time points in the vowel, measurements should be taken. If research focusses on the classification of vowels, it is common practice to try and locate that part of a vowel which is presumably most representative of its intended quality, known as the acoustic vowel target. In monophthongs, the vowel target typically occurs at or close to the temporal midpoint of the vowel, where the influence of flanking segments is minimal and formant values are relatively stable. There are several methods to automatise this procedure, which involve taking measurements either at pre-specified absolute or proportional distances from the vowel margins or at time points which mark a change in direction for one or more formants (Thomas, 2011, 150-152).

The perceptual distinction between monophthongs and diphthongs is quite salient, as diphthongs seem to involve not one but two vowel targets. It is not straightforward, however, how best to describe diphthongs in acoustic terms. Three contemporary approaches for modelling vowel-inherent spectral change have proven somewhat successful in determining the spectral and temporal features listeners use in identifying diphthongs, each taking the position that vowel onset formant values are relevant: the onset+offset hypothesis, which holds that listeners additionally and minimally need a certain amount of change by vowel offset, the onset+direction hypothesis, which asserts that the only additionally relevant factor is the direction of movement, and the onset+slope hypothesis, which claims that listeners additionally attend to both the direction and rate of movement (see Morrison, 2013). On reviewing the relevant literature, Morrison (2013, 31) found that the onset+offset hypothesis was superior in terms of "leading to higher correct-classification rates and higher correlation with listeners' vowel identification responses" (31) in both nominal monophthongs and diphthongs. He also stated that simple models based on formant measurements taken at two time points, onset and offset, have, as yet, not been outperformed by more complex models which fit curves to whole formant trajectories.

Instrumental acoustic phonetic methods permit examination of some variables which cannot be analysed impressionistically. They can capture the operation of low-level phonetic features within the larger realm of linguistic variation and change and may, thus, aid in explaining phonological phenomena. A good example is the work by Moreton and Thomas (e.g. 2007, cf. section 4.2.2.3), who examined subtle voicing-conditioned effects of consonants on the glide of preceding diphthongs, which may be involved in the development of allophonic rules such as 'Canadian raising'. In this respect, sociophonetic research, while recognising the intertwined nature of linguistic variation and social meaning, offers to go beyond the mere discovery of social function. According to Foulkes et al. (2013), "the unifying theme of sociophonetic work is the aim of identifying, and ultimately explaining, the sources, loci, parameters, and communicative functions of socially-structured variation in speech" (704). Research within the sociophonetic framework explicitly invokes an intersection between the fields of sociolinguistics and phonetics. Both parent fields are characterised by their own general aims and methodological priorities, which need to be balanced if they are to be combined fruitfully. Sociolinguistic studies require their speech samples to be as natural for a given speaker and as representative of a given speaker group as possible. Phoneticians, conversely, value replicability most highly and aim for maximum experimental control. As Hay and Drager (2007) argued, only a combination of sociolinguistic, anthropological and phonetic research tools will permit an integrated understanding of how phonetic and phonological variation is produced and perceived in its social context.

2.4.4 Acoustic studies of Caribbean creole vowels

Most research reports on acoustic analyses of vowels in the Caribbean are centred on language varieties in the Jamaican creole continuum. Veatch (1991) investigated the acoustic characteristics of the vowels produced by two male representatives each of four English-related varieties, mesolectal Jamaican Creole (JamC), Chicago White English, Alabama English, and Los Angeles Chicano English, in an effort to provide a variety-specific "phonetic grammar" which relates surface phonological structures to measurable phonetic forms. For JamC, he posited seventeen vowel qualities, including six short, eight long or diphthongal and three r-coloured vowels, distributed in a triangular or V-shape in F1×F2 acoustic space. High and mid long/short vowel pairs were found to differ also in vowel quality, with the longer counterparts raised and peripheralised, which allowed them to function as separate subsystems in sound change.

One of the variables that Patrick (1999b) analysed in his study on social variation in urban mesolectal JamC was (KYA), which refers to the variable insertion of a palatal glide after velars and before low vowels. The front/back distinction among low vowels has been lost for many, especially working-class, JamC speakers, so that the vowels in words like *cat* and *cot* are spectrally indistinguishable. Patrick (1999b) provided acoustic measurements of tokens in the low-vowel space for two speakers, Rose and Tamas, who exemplified the "prestige" and "traditional" pattern, respectively. He found that even though Tamas and speakers like him did not distinguish low front and low back vowels qualities, (KYA) consistently occurred only in those contexts, where the vowel was low and front in 17th century British dialects – and still is for prestige speakers like Rose. He, thus, concluded that (KYA) must be a phonolexically distributed variable, which serves to distinguish minimal pairs for at least some creole speakers.

The most comprehensive and comparatively large-scale acoustic study of JamC vowels was conducted by Wassink (1999a, 2001), who compared the vowel systems of ten basilect-dominant, rural-oriented and nine acrolect-dominant, urban-oriented speakers of JamC, linking phonetic features with sociolinguistic factors. As Veatch (1991) before, she found a basic V-shaped distribution of vowels in F1×F2 acoustic space, though a pattern could be discerned which distinguished basilect- from acrolect-dominant speakers: For the latter, vowels were distributed fairly evenly along the periphery of the vowel space, while the former produced a clustering of vowels in the high front, low, and high back regions (Wassink, 1999a, 176-182). One of the main aims of Wassink's study was to assess the nature and relative role of vowel quantity and quality differences in phonemic contrasts, based mainly on word-list data. She found that the temporal distinction in tense/lax vowel pairs was more salient for high back /uː, u/ than for the other vowel quality subsystems /iː, i/ and /aː, a/, but the long/short duration ratios for all vowel pairs came close to or exceeded 1.6, the lower bound for languages with phonemic length distinctions. On average, basilect-dominant speakers showed slightly higher duration ratios. As concerns vowel quality, Wassink found that both basilect- and acrolect-dominant speakers displayed some spectral distinctions, but that the former showed a greater tendency towards spectral overlap of tense/lax vowel pairs. In conjunction with the temporal findings, she argued that this may suggest that spectral distinctiveness does not play as prominent a role in tense/lax contrasts for basilect-dominant speakers as it does for acrolect-dominant ones (Wassink, 1999a, 168-173). Combining visual assessment of vowel system data, acoustic and auditory analyses, she argued for a phonological interpretation of her results and proposed two distinct vowel systems for basilectal and acrolectal JamC (Wassink, 2001, 150-151).

Acoustic analyses of the vowel systems of other Caribbean creole varieties are more cursory and provide basic overviews of the vowel productions of individual speakers, usually with the intention of using them as preliminary models of comparison with other language varieties. Thomas (2001) published a monograph meant as a reference tool, which examines the acoustic variation in vowel configurations in a wide range of English varieties in the North American context. The vowel systems of individual speakers are illustrated in the form of F1×F2 vowel formant plots, where monophthongs are represented by points and diphthongs by arrows extending from the first target (nucleus) to the second target (glide). Accompanying comments point out the most salient features of a given dialect or idiolect. Creole varieties are represented by four speakers: a basilectal Guyanese Creole speaker, a mesolectal Jamaican Creole speaker, an upper-mesolectal speaker from Grenada, and an early mesolectal Gullah speaker born in 1844 (161-165). Thomas explicitly noted that the creole vowel systems provided do not capture the entire range of variation in these varieties and "are included here for comparison with African American vowels" (161). The vowels of three of the creole speakers had been analysed previously by Thomas and Bailey (1998) to show that early African American Vernacular English (AAVE) shares a number of phonetic and phonological features with American creoles, in particular monophthongal /e/ and /o/ (lexical sets FACE and GOAT) and non-fronted /au/ (MOUTH), which may indicate common substrate influence.

The only acoustic analysis of vowels in Bahamian varieties was conducted by Childs et al. (2003), who presented a study of accommodation patterns between white and black Bahamian speakers on the island of Abaco. The general setting of Abaco is "somewhat isolated from the other islands in the Bahamas" (6) and, impressionistically, the black variety investigated is "a little different from the Nassau dialect, which tends to be a bit more vernacular" (10). The immediate application of their findings to the urban BahC context, therefore, seems doubtful, and any generalisations which might be drawn from their study have to be evaluated carefully. The results of an acoustic analysis of vowel qualities produced by three white and three black Abaconians, chosen to represent three age groups in their respective speech communities, are presented in such a way that they are directly comparable to the vowel configurations in Thomas (2001). Childs et al. (2003) document affinities with both southern US dialects, including AAVE, and Caribbean creole varieties. White Abaconians, for instance, shared the fronting of back vowels in /au, o, u/ (lexical sets MOUTH, GOAT and GOOSE) with a number of southern white dialects, which was absent in the speech of black Abaconians. Black Abaconians displayed weakened glides in /ai/ (PRICE) before voiced consonants, which is common among AAVE speakers and has spread to other southern US dialects. Glide-weakening in PRICE was also found in the vowel productions of the youngest white Abaconian speaker and may be attributed to influence from the US or accommodation to black norms. /ʌ/ (STRUT) was backed and rounded in the speech of both black and white Abaconians; for black participants, STRUT approached and overlapped with /ɔ/ (THOUGHT), which is a well-documented feature of other Caribbean creoles and Gullah but rare in non-creolised US varieties (19-26). Based on these and other observations concerning the identity and distribution of vocalic and consonantal variants, Childs et al. (2003) concluded that the black and white speech communities on Abaco showed signs of both bilateral accommodation and a continuation of an ethnic divide. In addition, they argued that, while Abaconian Bahamian varieties may share certain features with varieties in North America, Great Britain and the Caribbean, "no particular source aligns isomorphically with all the features of these varieties" (19). It is, thus, reasonable to assume that "the true history of vowel development [...] is tied to founder effects, contact, accommodation, and innovation" (19).

2.4.5 The Bahamian Creole vowel system

Despite its interesting linguistic ecology, research on Bahamian speech and, in particular, on Bahamian vowels has been scarce. The first systematic description of Bahamian vowels was published in John Wells' *Accents of English* (1982), where, based on earlier impressionistic accounts and the intuitions of one Anglo-Bahamian informant, he imparted "tentative' (590) information on the Bahamian vowel system. Another early source is Holm and Shilling's *Dictionary of Bahamian English* (1982), which contains a rough pronunciation guide of example words in "relaxed Nassau speech" (vii) according to the authors' personal experience. The most recent, comprehensive account of Bahamian vowels and their lexical incidence was presented by Childs and Wolfram (2004), who provided a structured compilation of previous reports. In addition to Wells (1982), they relied heavily on the information derived from the acoustic study in Abaco by Childs et al. (2003), which was introduced in section 2.4.4 above. Further descriptions of Bahamian vowels can be found in Shilling (1980), Holm (1983), Donnelly (1997), Reaser (2010), and Hackert (2013). In the following, the key contributions by Wells (1982), Holm and Shilling (1982), and Childs and Wolfram (2004) will be referred to as *Wells*, *HS*, and *CW*, respectively.

The nature of the available source materials is rather heterogeneous, as, for the most part, the authors did not distinguish consistently between the different regional and social varieties found in the Bahamas. CW explicitly ignored variation on the basilect-acrolect continuum, which they considered more relevant for the description of morphosyntactic than phonological features. While it may be true that it is difficult to draw a fundamental distinction between dialectal and creole varieties based on phonetic and phonological properties (see section 2.3.4), this does not imply that creole speech communities have only one invariant model of pronunciation. As Holm (2004) noted, "[s]peakers' phonologies can vary considerably depending on their position on this continuum of lects, as can the phonology of a single speaker who commands a range of lects for different social situations" (140). Research in the Jamaican context (e.g. Wassink, 1999a; Patrick, 1999b; Irvine, 2008) shows that socially and stylistically conditioned varieties, which may be categorised as basilectal, mesolectal and acrolectal, indeed display significant differences on the level of phonetics and phonology. When discussing aspects of creole vowel systems, it is, thus, absolutely necessary to address and investigate the dimension of social variation.

Table 2.3 describes the lexical incidence of vowels in Bahamian varieties according to the reports in HS, Wells and CW. The lexical sets were roughly ordered according to vowel quality to enhanced readability. Table 2.4 presents the corresponding vowel systems, with proposed phonemes grouped for convenience into three categories: short/neutral vowels, long vowels, and diphthongs. Wells explicitly proposed a vowel system of "Bahamian speech" (590), which is replicated with only minor modifications reflecting further comments he made in the accompanying text. The vowel systems for HS and CW were derived from their descriptions of the lexical incidence of vowels. It is obvious that there is a high degree of disagreement between authors as well as some variation inherent to the individual systems, which was variously attributed to free or socially constrained variation. All authors described BahC as a non-rhotic accent, which is reflected in the centring diphthongs in NEAR/SQUARE, and, possibly, in CURE, FORCE and NORTH. Also, all proposed vowel systems make use of both vowel quality and vowel quantity distinctions, but the salience attributed to their respective roles in marking phonological contrasts varies across accounts. According to CW, there are only two long vowels, /ɑː/ and /uː/, and other contrasts seem to rely primarily on differences in vowel quality.

It is in the low vowels and mid to low back vowels, distributed across the lexical sets TRAP, BATH, START, PALM, THOUGHT, CLOTH, LOT and STRUT,

Table 2.3: Lexical incidence of vowels in Bahamian varieties according to HS, Wells, and CW

Lexical set	HS	Wells	CW	Lexical set	HS	Wells	CW
FLEECE	iː	iː	i	GOOSE	uː	uː	uː
KIT	ɪ	ɪ	ɪ	FOOT	ʊ	ʊ	ʊ
FACE	eː	eː	ei	GOAT	oː	oː	ou
DRESS	ɛ	ɛ	ɛ	FORCE	oː	oa	oə
TRAP	æ	a	a ~ æ	NORTH	ɔ	oa	ɔə
BATH	aː ~ æ	aː	a ~ æ	MOUTH	aʊ	ɑʊ	aɔ ~ ɑɔ
START	aː	aː	ɑː	PRICE	aɪ	ʌɪ	ai ~ ɑi
PALM	aː	aː ~ ɑː	ɑ	CHOICE	ʌɪ ~ ɔɪ	əi	ɔi
THOUGHT	ɔ	ɑː ~ ɔː	ɔ	NURSE	ʌɪ ~ ʌ	əi ~ ɜː	əi ~ ɜ
CLOTH	--	ɑː ~ ɔː	ɔ	NEAR	ɛə	ea	eə ~ iə
LOT	ɔ	ɑ ~ ɔ	ɑ	SQUARE	ɛə	ea	eə
STRUT	ʌ ~ ɔ	ʌ	ʌ ~ ɔ	CURE	--	oa	uə

where the accounts seem to diverge the most. TRAP is unanimously described as a short, low and fairly central vowel, but it remains unclear whether it contrasts with START and PALM primarily in vowel quality, vowel quantity, or both. BATH is grouped with START in Wells, with TRAP in CW, and occupies an intermediate, variable position in HS. Part of this confusion presumably derives from the varying vowel qualities ascribed to THOUGHT, CLOTH and LOT. For all authors, THOUGHT differs qualitatively from START. While HS and CW describe THOUGHT as short, back and rounded /ɔ/, Wells transcribes it as /ɑː/, overlapping with PALM; according to him, THOUGHT is rounded only in middle-class speech. Where CLOTH is included, it patterns with THOUGHT. LOT, however, is varyingly grouped with THOUGHT (HS), with PALM (CW) or described as a short version of THOUGHT (Wells). STRUT is described as extremely backed by all authors, a well-documented feature in many other Caribbean creoles, but only HS and CW note that is encroaches on THOUGHT.

HS and Wells describe the vowels in FACE and GOAT as long monophthongs /eː/ and /oː/, which is also typical of many Caribbean creoles and Gullah, but they are diphthongal /ei/ and /ou/ in CW. All authors propose closing diphthongs in CHOICE, NURSE, MOUTH, and PRICE. Diphthongal NURSE is a conspicuous feature of BahC, a "true marker" (Donnelly, 1997, 23), which is only replaced with monophthongal /ʌ/ or /ɜ(ː)/ in the acrolect. The authors disagree whether diphthongal NURSE is merged with CHOICE or whether contrast is preserved.

Table 2.4: Proposed vowel systems according to HS, Wells, and CW

Author	Short vowels	Long vowels	Diphthongs
HS	ɪ ʊ	iː uː	
	ɛ (ʌ), ɔ	eː oː	ɛə ʌɪ ~ ɔɪ
	æ	aː	aɪ, aʊ
Wells	ɪ ʊ	iː uː	
	ɛ ʌ	eː (ɜː) oː	ea əi oa
	a ~ ɑ (ɒ)	aː ~ ɑː (ɔː)	ʌɪ, ɑʊ
CW	i	uː	(iə) uə
	ɪ ʊ		eə, ei oə, ou
	ɛ ɜ* (ʌ), ɔ		əi* ɔə, ɔi
	a ɑ	ɑː	ai, aɔ

* variants of the same underlying phoneme

Realisations of MOUTH and PRICE, finally, appear relatively straightforward: All authors describe them as gliding from a low, fairly central position towards the hight back and high front of the vowel space, respectively. There are some comments in the literature, however, that PRICE and/or MOUTH may be involved in extensive allophonic variation (e.g. Childs and Wolfram, 2004, 441).

A direct comparison of the vowel systems in table 2.4 highlights some of the differences between the accounts already observed above. For HS and Wells, there is a roughly equal number of long and short vowels, while CW propose a relatively large amount of diphthongs. The contrast between long and short low (monophthongal) vowel phonemes may or may not depend additionally on differences in vowel quality. Depending on whether /ʌ/ has phonemic status, the vowel system proposed by HS comprises 15 or 16 vowel phonemes. Wells reserves some vowel qualities, /ɒ/, /ɔː/ and /ɜː/, for middle-class speakers only, so that the most basic vowel system, which may be considered basilectal, has 15 vowels, and the most elaborate, acrolectal system has 18 or 19 vowels. CW propose a minimum of 19 and a maximum of 21 vowel phonemes in the Afro-Bahamian vowel inventory, depending on the phonemic status of /ʌ/ and /iə/; /ɜ/ and /əi/ are variants of the same underlying phoneme.

2.5 Research objective and general research questions

Research on creoles has tended to emphasise their nature as language contact phenomena and, partly due to the difficulty of producing high-quality recordings of creole usage in these sociolinguistically complex societies, studies have mainly focussed on grammatical descriptions. So far, the literature lacks a detailed instrumental acoustic characterisation of the vowel systems operating within the Bahamian creole continuum. The present study seeks to remedy this situation and to extent the body of research in the sociophonetic paradigm by presenting an acoustic analysis of synchronic variation in the vowel system(s) of urban Bahamian speech. A major challenge in this study was the heterogeneous nature of the data and source materials, which will be introduced in detail in chapter 3. Another challenge concerned the relatively large scope of the study, which necessitated a balanced approach, combining in-depth, phonetically fine-grained analyses of individually selected variables with more holistic analysis methods for others, and with a sociolinguistic interpretation of the results. In what follows, the overarching research questions which motivated all analyses in this study will be outlined; concrete hypotheses regarding individual variables or groups of variables are relegated to their respective analysis sections.

One aim of this study was to provide a first in-depth acoustic description of the urban BahC vowel system. Apart form a purely descriptive scheme, the following questions guided the analyses:

1. Which proposed phonemic mergers or near-mergers can be substantiated by the results of acoustic analyses?
2. Can salient allophonic distribution patterns explain, to some extent, the apparent lack of agreement in the impressionistic accounts?
3. What is the relative role of spectral and temporal characteristics in marking phonological contrasts among monophthongs?

A second group of research questions focussed on aspects of sociolinguistic variation:

1. Which aspects of the BahC vowel system are subject to variation by social class? Which variables are especially prominent as social markers or even stereotypes in the urban Bahamian context?

2. Are non-standard variants associated consistently with the speech of lower-status participants? And, conversely, do higher-status participants consistently avoid non-standard variants?

3. How does stylistic variation relate to the social distribution of given variables?

4. Does gender play a role in the social distribution of investigated phonological variables? Does variation by gender reflect the 'typical' Western pattern in that female speakers show linguistic insecurity compared to male speakers?

5. In general, do acoustic analyses support the existence of a socially- and/or stylistically-anchored continuum of phonological variation in the urban Bahamian context, ranging from a more basilectal or non-standard to a more acrolectal or standard pole? Do all speakers follow the same pattern or, if not, which speakers disrupt the pattern and why?

6. The data pertaining to some speakers in this study were collected and previously used by Hackert (2004) in her investigation of past marking. How does the pattern of phonological variation exhibited by these speakers compare to their variation in morphosyntax?

Lastly, having established the realisation and lexical incidence of vowels in the urban Bahamian context, including their patterns of social and stylistic variation, how does the derived vowel inventory reflect the Bahamas' sociohistory and its position at the linguistic crossroads of the Americas?

1. How homogenous are the English-derived varieties spoken in the Bahamas? What are salient differences between the varieties spoken in Nassau, New Providence, and on Abaco (Childs et al., 2003)?

2. Has the geographical closeness of the Bahamas to the Caribbean region and their shared sociohistorical and cultural background resulted in linguistic accommodation, traceable in the realisation of vowels in Bahamian speech?

3. Which aspects of the Bahamian vowel inventory reflect the Bahamas' historical and linguistic connection to the North American mainland?

4. Which roles do standard American and standard British English play in the emergence of a local, i.e. Bahamian, standard model of pronunciation?

Chapter 3

Methodology

3.1 Conversational data

A subset of the speakers analysed in this study was drawn from tape-recorded one-on-one sociolinguistic interview sessions, which Stephanie Hackert conducted in 1997/98 as part of her research project on past temporal reference in urban BahC (Hackert, 2004). Individual sessions usually lasted between one and two hours, and, as Hackert took time to get to know her participants, resulted in relatively casual, conversational interview style. In total, Hackert produced and analysed recordings of 20 Nassauvian speakers. The quality of recordings differed considerably depending on where the interviews were conducted. Some interviews took place in a quiet corner of a local park or at the homes of participants, in which case the quality of recordings was generally sufficient for basic formant estimation. At other times, recordings were produced at the beach, in the streets or at the busy Strawmarket, rendering large parts inaccessible to acoustic analysis. A subset of 15 speakers was chosen, based mainly on the quality of recordings, to represent this group of speakers in the present study (see table 3.1).

All speakers were black, ranging in age from 25 to over 70. Pseudonyms were provided by Hackert (2004). In order to assign participants to different social classes, Hackert (2004) made use of the occupational classification scheme developed by Gordon (1987) for the Jamaican context. Gordon's model of class, status, and social mobility was introduced in section 2.3.3.2 and also informed decisions on class

Table 3.1: Speakers, recorded in 1997/98

Speaker	Age	Education	Class/Occupation
Jeanne	32	Secondary	MS-6/Sales clerk
SisterB	39	Secondary	MS-6/Sales clerk
MrsSmith	70+	Secondary	PB-1/Small proprietor
MrsWall	54	Primar	PB-2/Straw vendor
MrsMill	60+	Primary	PB-3/Hairdresser
George	55	Primary	WC-2/Cook
Sharon	28	Secondary	WC-3/Guard
Sidney	45+	Primary	WC-3/Guard
Carol	32	Secondary	WC-3/Janitress
Eddie	46	Primary	WC-4/Construction worker
Albert	60+	Primary	WC-4/Construction worker
Viola	49	Primary	WC-5/Cleaner
Shanae	25	Secondary	WC-5/Household helper
Johnny	25	Primary	WC-6/Agricultural labourer
Henry	55	Primary	WC-6/Agricultural labourer

divisions in the present study. For statistical analyses, the speakers were grouped into ten *lower-class speakers*, corresponding to the working-class participants in the sample, and five *higher-class speakers*, comprising all non-working-class participants. As can be seen in table 3.1, the category of higher-class speakers was represented exclusively by female participants, so that the analysis of gender differences was confined to lower-class speakers only. While information on the level of education is included in table 3.1 for the sake of completeness, it correlated with the participants' age and social class; therefore, the effect of education was not investigated for the speakers in this dataset.

3.2 Map task and citation form data

A second set of speakers was recorded during a DAAD-funded fieldwork trip to Nassau in the summer of 2014. The main goal was to collect data which would complement the conversational data collected by (Hackert, 2004), but allow fine-grained acoustic phonetic analyses of both spectral and temporal vowel characteristics. To this end, three major priorities had to be balanced:

1. The acoustic vowel signal is sensitive to background noise and, in addition,

formant and duration measurements are strongly influenced by the vowels' prosodic and consonantal environment. I accordingly sought to reduce noise factors in the recordings and control the variable context as far as possible.

2. The sample of speakers recorded was intended to be comparable to Hackert's, while avoiding its limitations regarding the skewed distribution of gender across social class. In addition, I originally intended to restrict data collection to speakers below the age of 30, which, however, proved to be extremely difficult.

3. In the Bahamas, scripted speech is strongly associated with English and the use of creole forms in these contexts tends to be stigmatised, resulting in the production of mainly acrolectal forms. While the analysis of acrolectal forms is certainly one of the focal points of the present study, I was particularly interested in exploring the interface between mesolectal and acrolectal speech. Thus, another data collection challenge concerned the elicitation of maximally casual speech patterns for at least some vowels without trading a more casual speech style for the quality requirements listed under point 1.

3.2.1 Speakers and recording conditions

The most time-consuming aspect of fieldwork during the summer of 2014 was the acquisition of participants. Depending on the target group, i.e. higher- versus lower-class speakers, the search for participants progressed via two different channels. Even before I had left for the Bahamas, I was already in contact with two lecturers at the College of The Bahamas, who offered to introduce me to some of their students who might be willing to participate in my study, presumably qualifying as higher-class speakers. As for lower-class speakers, I had planned to approach potential participants outside the university setting, gradually extending my network of contacts via the 'friend of a friend' approach.

After my arrival in Nassau, I contacted my acquaintances at the College of The Bahamas, who provided much needed help and support during the first days of my stay in the Bahamas. I was introduced to other members of staff as a visiting researcher and offered a desk in a shared office space, where I would be able to conduct my recordings. This was, of course, a very generous offer and I was happy with the arrangement, even though the recording conditions were certainly not ideal from an acoustic phonetic point of view: It was not always possible to arrange recording sessions during the absence of the other three occupants of the office space, who would frequently talk with students or answer the telephone. In addition, the air-conditioning system gave off a relatively loud humming sound and could only be turned off for about ten minutes at a time due to the intense heat and humidity of the Bahamian climate. During the first two weeks, the search for suitable participants progressed slowly, but, in time, students I had already met would introduce me to their friends and fellow students and the pool of potential participants began to grow. One lecturer was especially helpful and offered bonus points to the students enrolled in his English writing course for participating in my study.

Outside the university setting, my search for participants began with an attendance at church. Religion and Christian faith are a central part of Bahamian life, and when an acquaintance I had met at my guest house invited me to join her for service at a new and vibrant denomination-free church, I was happy to accept. The members of the congregation were very welcoming and outgoing. I exchanged phone numbers with some of them, who would introduce me to some acquaintances, who would in turn introduce me to some more acquaintances and so on, until I met my first participants. Recordings were made in different places and under somewhat varying conditions but, in general, background noise could be kept to a minimum. Most recording session were conducted in the living room of a very helpful friend. Others took place, for example, at a quiet bar just before lunch hour or early in the morning in a small shop off main street. In correspondence to the wishes of local researchers I could not offer monetary recompense to potential participants. While this may have initially slowed down the process of acquiring speakers, it may have also contributed to a more informal atmosphere.

By the time I left Nassau, I had collected recordings of 30 speakers. Some of the recordings had to be dismissed for one or more of the following reasons: the speaker was not a member of the targeted age group (younger than 18 or older than 60); the speaker had recently been abroad for more than six months at a time or went abroad regularly due to close family ties; the speaker was born on another island in the Bahamas and had moved to Nassau only recently. Nine higher-class speakers and nine lower-class speakers were finally chosen for further analysis (see table 3.2).

In table 3.2, *Ben* and *Beth* and *Art* and *Ada* are pseudonyms given to male and

Table 3.2: Speakers, recorded in 2014

Speaker	Age	Class/Occupation	Class of parents/spouse
Ben01	18	MS-1,2/Stud. of electrical engineering	MS-1/Minister of Gov.
Beth05	18	MS-1,2/Stud. of tourism management	MS-3/Surgical technologist
Beth02	19	MS-1,2/Stud. of biochemistry	MS-4/Accounting clerk
Ben02	21	MS-1,2/Stud. of history	MS-6/Shop supervisor
Ben03	21	MS-1,2/Stud. of electrical engineering	WC-2/Plumber
Ben04	20	MS-1,2/Stud. of banking and finance	WC-3/Stevedore
Beth06	18	MS-3/Stud. of nursing	MS-6/Sales clerk
Beth07	18	MS-3/Stud. of nursing	PB-3/Entrepreneur
Beth03	18	MS-3/Stud. of nursing	WC-3/Waitress
Art06	23	WC-2/Life guard	WC-4/Contractor
Art04	25	WC-3/Barman, musician	MS-3/Real estate agent
Ada01	50+	WC-3/Janitress, copy shop assistant	PB-2/Electrician
Ada05	48	WC-3/Waitress	PB-3/Entrepreneur
Art01	20	WC-3/Waiter	?
Ada03	44	WC-3/Office assistant	WC-?/Unemployed
Ada02	40	WC-4/Stock clerk	WC-4/Porter
Art02	23	WC-4/Unskilled technician	WC-1/Police officer
Art03	40	WC-4/Porter	WC-4/Stock clerk

female higher- and lower-class speakers, respectively. All higher-class speakers were students at the College of The Bahamas, which was deemed to yield a relatively homogenous speaker group. Their respective occupational class was estimated from the positions they would likely hold once graduated. Though all of the lower-class speakers had had some secondary-level education, none had ever seriously contemplated college classes; the occupation noted for this group of subjects is usually the highest position achieved, except in cases where a change in jobs occurred very recently or where the position was never held for very long. Overall, the set comprised nine female and nine male speakers, distributed fairly evenly across social class. Unfortunately, it was not possible to restrict participants to speakers aged 30 and below; thus, while most participants were between the ages of 18 and 25, five lower-class speakers, mainly female, were between 40 and around 55. The fourth column in table 3.2 notes the occupational class of the younger speakers' parents (highest position held by any parent) or, for those speakers aged 40 and above, the occupational class of their spouse. It seems that the students comprising the higher-class speaker group may not have been as homogenous as originally thought. Still living with their parents or having moved out of their parents' homes only recently, it is likely that the students were still strongly influenced by their parents' social class. While the effect of the parents' social class was not investigated statistically in this study, it was considered in the discussion of the linguistic ranking of individual speakers in the general discussion in chapter 6. For easy reference, table 3.3 provides the total number of speakers analysed in this study by year of recording, social class and gender. For each speaker group, it also includes the participants' mean age at the time of recording, along with standard deviations.

Table 3.3: Total number of participants by year of recording, social class and gender

Year of rec.	Class	Female (mean age)		Male (mean age)	
1997/98	Higher	5	(51.0 ± 15.5)	0	(–)
	Lower	4	(33.5 ± 10.7)	6	(47.7 ± 12.5)
2014	Higher	5	(18.2 ± 0.4)	4	(20.0 ± 1.4)
	Lower	4	(45.5 ± 4.4)	5	(26.2 ± 7.9)

3.2.2 Elicitation materials and recording

All participants were asked to wear headsets and were recorded using a Zoom H4n handy recorder. Sessions usually lasted between 60 and 90 minutes and all participants were presented with the same elicitation materials. Before the actual recording started, participants and I would fill in a short demographic questionnaire together (see figure A1.1 in the appendix A1). I also used the time to get to know my participants and to make them feel more comfortable with wearing headsets and with the set-up of the experiment in general. We talked about their personal experiences and opinions about the linguistic situation in the Bahamas, about tourism and the USA, about the relation between the Bahamas and the Caribbean, and about special Bahamian vocabulary and slang words. The latter was an especially popular topic among my participants, as most took great joy in having me try and pronounce whatever items they offered. The actual experiment consisted of two parts. Part one was designed to elicit citation form data for each participant separately. Part two consisted of an interactional map task, in which target words are produced in a natural, interactional peer-group context while still allowing the experimenter control over the consonantal context of vowels. In what follows, the elicitation material for both tasks will be introduced in more detail.

3.2.2.1 Citation form data

During the first part of the experiment, participants were asked to read out a number of isolated words, with each lexical set represented at least four times. The choice of words was determined by the following criteria, listed from highest to lowest priority:

1. Words should be meaningful and ideally part of basic vocabulary.
2. Across lexical sets, target vowels should occur in similar consonantal contexts: /b,p,f,h/V/d,t,z,s/.
3. For each lexical set, the number of words in which the target vowel is followed by a voiced or voiceless consonant should be roughly equal.
4. Words should be monosyllabic and monomorphemic.
5. Initial and final consonant clusters should be avoided.

In total, 207 words were selected (see appendix A1, table A1.1 for a full list) and each was printed on two separate cards. Introducing extra fillers or distractors was not necessary, as the different lexical sets already served as distractors for each other. Where possible, words were accompanied by illustrations intended to support participants who might have trouble identifying some of the words. This procedure produced two identical decks of cards, which were presented to participants in randomised order (see fig 3.1). During the experiment, participants would be handed one card at a time in order to prevent list intonation.

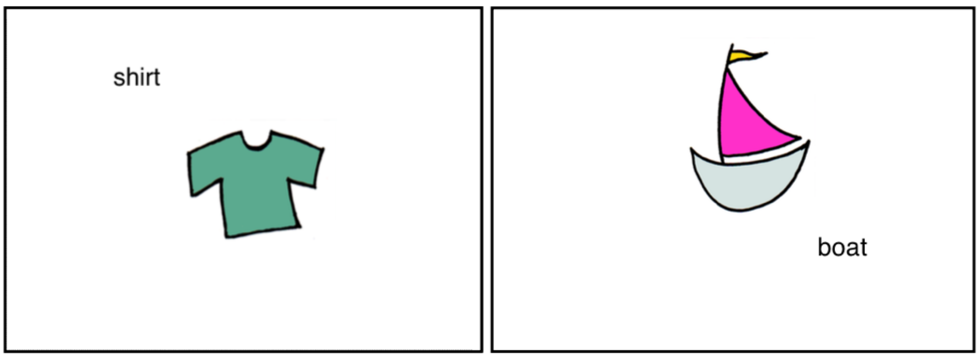

Figure 3.1: Example of cards used in the collection of citation form data

As fieldwork progressed, it became clear that a small number of words contained in the decks of cards would not be available for analysis in this study, either because participants regularly confused them with other words or because they were not in common use in the Bahamas and, thus, unknown to some of the speakers. In addition, some consonantal contexts and all words pertaining to the lexical sets NEAR, SQUARE, NORTH, and FORCE were later excluded from this study. Table 3.4 lists all lexical sets (19) and word types (151) that were ultimately subjected to further analysis. Vowels in bisyllabic words were only used for spectral measurements, while vowels in the words marked with an asterisk were only used for temporal measurements. The lexical sets FACE, GOAT, MOUTH, PRICE, CHOICE and NURSE, potentially containing diphthongs, were represented by more words and by more varied consonantal contexts than the others. This is because they were analysed in more detail and, specifically, they were compared to productions in the map task speech style.

Table 3.4: Words analysed in this study in citation form, by lexical set and following voicing context

Lexical set	Context	Items	Types
FLEECE	Pre-voiced	bead, feed, heed	3
	Pre-voiceless	beat, feet, heat	3
KIT	Pre-voiced	bid, fiddle, hid	3
	Pre-voiceless	bit, fit, hit	3
DRESS	Pre-voiced	bed, fed, head	3
	Pre-voiceless	bet, pet	3
TRAP	Pre-voiced	bad, pad, had	3
	Pre-voiceless	bat, fat, hat	3
BATH	Pre-voiceless	bath, path, fast, basket	4
START	Pre-voiced	bard, bars, hard, card, garden, cars	6
	Pre-voiceless	Bart, part, heart, cart	4
PALM	Pre-voiced	father, spas	2
STRUT	Pre-voiced	bud, buzz	2
	Pre-voiceless	butt, bus, hut	3
THOUGHT	Pre-voiced	paws, laws	2
	Pre-voiceless	bought, fought, caught, talk*	4
CLOTH	Pre-voiceless	boss, foster, cost	3
LOT	Pre-voiced	pod, body, cod	3
	Pre-voiceless	pot, hot, cot	3
GOOSE	Pre-voiced	booze, food, who'd	3
	Pre-voiceless	boot, booth, hoot	3
FOOT	Pre-voiced	hood, good*	2
	Pre-voiceless	put, foot, book*	3
FACE	Pre-voiced	bathe, fade, daisy, gaze, haze	5
	Pre-voiceless	bait, fate, date, gate, hate	5
GOAT	Pre-voiced	bows, toad, toes, code, hose	5
	Pre-voiceless	boat, dote, dose, goat, host	5
MOUTH	Pre-voiced	powder, loud, thousand, cloud, cloudy, cows, how'd	7
	Pre-voiceless	spouse, mouse, south, doubt, couch, house	6
PRICE	Pre-voiced	pies, died, tide, side, size, guide, hide	7
	Pre-voiceless	bite, dice, tight, sight, slice, kite, height	7
CHOICE	Pre-voiced	boys, poison, toys, joys, noise, noisy	6
	Pre-voiceless	Boyce, moist, toy-store, Joyce, choice, foist, hoist	7
	Word-final	boy, coy, toy, soy	4
NURSE	Pre-voiced	bird, murder	2
	Pre-voiceless	birth, person, first, dirt, dirty, turtle, shirt, nurse, nursing, church, hurt, curse	10
	Word-final	purr, stir, sir	3
Total	–	–	151

3.2.2.2 Map task data

The elicitation technique employed in the second part of the experiment is a partial adaptation of the *map task* used in the construction of the HCRC Map Task Corpus (Anderson et al., 1991), in which "speakers must collaborate verbally to reproduce on one participant's map a route printed on the other's" (351). The map task was designed to elicit spontaneous, interactional speech while avoiding some obvious drawbacks usually involved in the collection of conversational data: As the experimenter retains some control over lexical items and discourse content, it is ensured that the linguistic phenomena of interest are adequately represented in number and that they occur in relatively controlled variable contexts.

The general map task set-up involves two participants, sitting opposite of each other. Each has a map which the other cannot see, consisting of labelled landmarks. The two maps are similar though not identical, and the participants are told this explicitly at the beginning of the session. One participant is designated the *instruction giver* and has a route marked on their map; the other participant, the *instruction follower*, has no route on their map, only a spot marked as the starting point. The speakers are then instructed to reproduce the instruction giver's route on the instruction follower's map.

As Anderson et al. (1991) noted, the range of linguistic applications of map tasks "is constrained only by the ingenuity of the artists [and] the names of the landmarks can be designed to be of phonological interest" (352-353). Thus, the maps used in this study were designed to elicit as many words as possible pertaining to the lexical sets FACE, GOAT, MOUTH, PRICE, CHOICE and NURSE. Figure 3.2 gives an example of one such pair of maps used in the experiment. In total, two versions each of two different maps were created, so that during one recording session each of the two participants would act twice as instruction giver and twice as instruction follower. As the speakers participating together in the map tasks knew each other well – they were usually colleagues or friends – interactions tended to be casual and informal. Table 3.5 lists all the words, grouped by lexical set, which occurred in the maps' landmark labels and which were subjected to further analysis. More example maps can be found in the appendix A1 (figures A1.2 and A1.3).

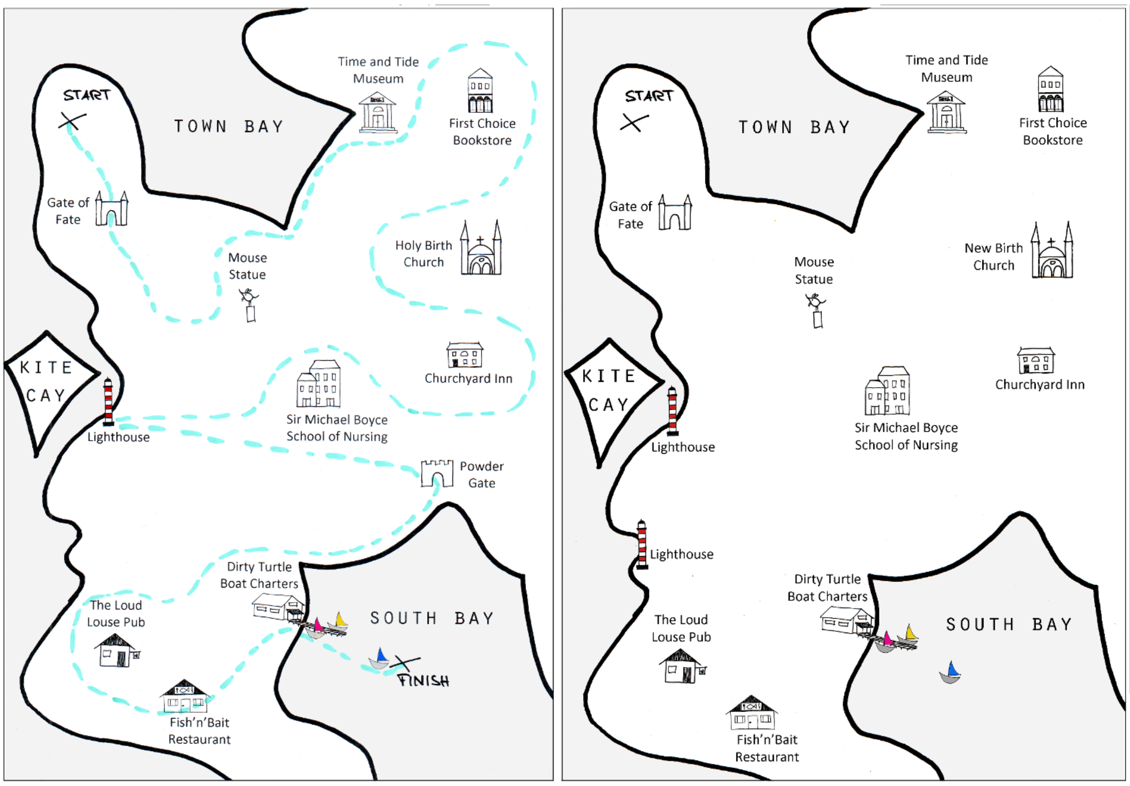

Figure 3.2: Example of a pair of maps used in the collection of map task data (left: instruction giver; right: instruction follower)

Table 3.5: Words analysed in this study in map task style, by lexical set and following voicing context

Lexical set	Context	Items	Types
FACE	Pre-voiced	bathe, daisy, haze	3
	Pre-voiceless	bait, fate, gate	3
GOAT	Pre-voiced	bows, toad, toes	3
	Pre-voiceless	boat, goat	2
MOUTH	Pre-voiced	powder, loud, thousand, cloudy,	4
	Pre-voiceless	mouse, south, house	3
PRICE	Pre-voiced	pies, tide, side, hide	4
	Pre-voiceless	bite, dice, kite, height, light, night, knight	7
CHOICE	Pre-voiced	boys, poison, noisy	3
	Pre-voiceless	Boyce, toy-store, Joyce, choice	4
NURSE	Pre-voiced	bird	1
	Pre-voiceless	birth, first, dirty, turtle, nursing, church	6
Total	–	–	43

3.3 General analysis procedure

3.3.1 Preprocessing of recordings

All sound files were first processed in the audio editor *Audacity* (Audacity Team Members, 2016). The 1997/98-tape-recordings were digitised at 22.05 kHz and quantised to a 16 bit number using a USB Audio/MIDI Interface (Edirol UA-20). They were then divided into smaller, more manageable-sized individual files. Speech recorded during fieldwork in 2014 was sampled at 44.1 kHz and quantised to 16 bit. In *Audacity*, fieldwork sessions were cut according to speaker and task and irrelevant parts were removed. All files were converted to monophonic sound and saved in .wav format.

Word-level transcriptions were produced in *ELAN* (Wittenburg et al., 2006). Large parts of the 1997/98-recordings had already been transcribed by Hackert and the transcriptions only needed to be temporally anchored to the sound files. Time-stamped annotation tiers were then saved as tab-delimited text files for import in *Praat* (Boersma and Weenik, 2009).

In *Praat*, all mono- and bisyllabic words, which contained lexically stressed target vowels and were of adequate quality for acoustic analysis, were manually marked and then automatically extracted and recombined to shorter files of a maximum length of about three minutes. In the 1997/98-recordings, at least ten word tokens, if possible, were collected for each speaker and lexical set, with no more than two tokens of the same lexical item. Different word forms of the same lexeme were considered different lexical items. Pre-nasal and pre-liquid vowel contexts were avoided as well as words in which vowels were preceded by /r/ or semivowels. For the lexical sets TRAP and BATH, post-/k,g/ vowel contexts were also discarded, as they were typically realised with a strong palatal glide following the velar. For the analysis of some vowels, the selection criteria were somewhat stricter, which will be discussed in the respective analysis sections. In the map task 2014-recordings, maximally four tokens of the same lexical item were randomly chosen for further analysis. In the citation form 2014-recordings, all clearly articulated word tokens were selected. The vowels in the map task and citation form data occurred exclusively in pre-alveolar or word-final contexts.

3.3.2 Segmentation and measurements

Words extracted from the 1997/98-recordings were segmented manually in *Praat*. Words from the 2014-recordings were segmented automatically in *WebMAUS* (Kisler et al., 2016) and segmentation boundaries were manually corrected in *Praat*. The vowel onset was determined from the waveform and set at the first regular pitch pulse. The vowel offset was marked at the last regular pitch pulse or at the point at which the complex wave smoothed. In uncertain cases, the spectrogram was additionally consulted and vowel offset was marked at the point at which F2 disappeared. All boundaries were placed at positive zero crossings. Some further annotations were added to each vowel token, not all of which were relevant to later analyses. Annotations which did inform later analyses included marking the auditory presence of post-vocalic /r/ in the lexical sets START and NURSE, and marking the distinction between the lexical sets BATH/PALM/START and THOUGHT/CLOTH, respectively, to which the automatic segmentation software had applied the same phonetic symbols.

All acoustic measurements were carried out in *Praat* in a supervised automatic procedure using linear predictive coding (LPC). The parameters were initially set to the *Praat* default, though the number of expected formants was adjusted in some cases to improve formant readings. F1 and F2 measurements were taken at 10% intervals through the vowel, each measurement representing the median across a 10 ms window, and confirmed or corrected by visual inspection. Duration was measured from vowel onset to vowel offset. All measurements and annotations were save to text file for further analysis in *R* (R Core Team, 2016).

Obviously erroneous formant readings and extreme outliers were manually removed from the data. In total, 10169 vowel tokens ultimately entered into the analyses of this study, 3387 from the conversational data, 1524 from the map task data, and 5258 from the citation form data. Table 3.6 lists the total number of tokens as well as the mean number of tokens per speaker for each lexical set and speech style. For a detailed breakdown of the types and tokens produced by each speaker, see tables A2.2 and A2.3 in the appendix A2.

Table 3.6: Total number and average speaker number of tokens per lexical set and speech style

Lexical set	Conversational		Map task		Citation form	
	Total	Per speaker	Total	Per speaker	Total	Per speaker
BATH	132	8.8	–	–	135	7.5
CHOICE	62	4.1	219	12.2	531	29.5
CLOTH	67	4.8	–	–	95	5.3
DRESS	227	15.1	–	–	172	9.6
FACE	390	26.0	183	10.2	514	28.6
FLEECE	200	13.3	–	–	204	11.3
FOOT	157	10.5	–	–	170	9.4
GOAT	226	15.1	184	10.2	496	27.6
GOOSE	63	4.2	–	–	185	10.3
KIT	271	18.1	–	–	210	11.7
LOT	267	17.8	–	–	200	11.1
MOUTH	146	9.7	305	16.9	410	22.8
NURSE	197	13.1	113	8.7	98	9.8
NURSE+/r/	2	0.1	179	11.2	408	22.7
PALM	20	1.3	–	–	72	4.0
PRICE	263	17.5	341	18.9	470	26.1
START	148	9.9	–	–	134	8.4
START+/r/	0	0.0	–	–	182	11.4
STRUT	250	16.7	–	–	174	9.7
THOUGHT	68	4.5	–	–	197	10.9
TRAP	231	15.4	–	–	201	11.2

3.3.3 Vowel normalisation

Due to the effect of physiological inter-individual differences, direct comparison of acoustic data in Hertz can be problematic. Hillenbrand et al. (1995), for instance, demonstrated that, depending on the vowel, F1 and F2 frequencies of women are between 10% and 30% higher than those of men (3103). For this reason, the raw formant frequencies were first converted to Bark scale, and then the *S-transform*, a speaker-dependent, vowel-extrinsic normalisation technique developed by Watt and Fabricius (2002) and later modified by Fabricius et al. (2009) was applied to the Bark-scaled values. The rationale behind the S-transform is similar to other well-known algorithms in that the grand mean of a speaker's vowel space in the F1 and F2 dimensions is estimated from the available data and then used to calculate normalised values. Unlike established algorithms such as Lobanov's or Nearey's methods, however, the centroid or grand mean values are not based on all the vowels of a given speaker but derive from three points representing the maximum spread of the speakers vowel space. Therefore, the S-transform is potentially less sensitive to variations in sample size across speakers and vowel categories and in the distribution of individual vowel categories in formant space, which are important advantages for the data in this study. Recent assessments of vowel formant normalisation procedures have found that the performance of the S-transform is comparable in effectiveness to Lobanov's and Nearey's methods (Fabricius et al., 2009; Clopper, 2009; Flynn and Foulkes, 2011).

For each speaker, a centroid S was derived from three vertex points representing the maximum spread of the speaker's vowel space in the F1 and F2 dimensions: one for the high front corner (I), one for the high back corner (U), and one for the bottom corner (A). The mean F1 and F2 values of the FLEECE vowel[1] were used as coordinates for I; the mean F1 of FLEECE was also used as both F1 and F2 coordinates for U, a precaution to counteract potential fronting of high back vowels. The F1 coordinate for A was defined as the mean F1 of the vowel in TRAP[2], while its F2 coordinate was defined as the mean of the F2 coordinates of the high front and high back vertex points (3.1). The centroid S was then calculated as the mean of all three vertex points (3.2); normalised formant values were derived by expressing

[1]Measurements of FLEECE were taken at the F2 maximum between 40% and 60% into the vowels.

[2]Measurements of TRAP were taken at the F1 maximum between 40% and 60% into the vowels.

formants relative to the centroid (3.3). Throughout this study, normalised formant frequencies were used for most analyses and plots; the reference to normalised values was marked with the use of an apostrophe: F1', F2'.

(3.1)
$$
\begin{aligned}
I &= \big(I_{F2},\ I_{F1}\big) = \big(\overline{FLEECE}_{F2},\ \overline{FLEECE}_{F1}\big)\\
U &= \big(U_{F2},\ U_{F1}\big) = \big(I_{F1},\ I_{F1}\big)\\
A &= \big(A_{F2},\ A_{F1}\big) = \big(\frac{I_{F2}+U_{F2}}{2},\ \overline{TRAP}_{F1}\big)
\end{aligned}
$$

(3.2)
$$S_{Fi} = \frac{I_{Fi}+U_{Fi}+A_{Fi}}{3}$$

(3.3)
$$X_{Fi}^{norm} = \frac{X_{Fi}}{S_{Fi}}$$

3.3.4 Statistical testing

In this study, most variables under investigation were analysed statistically using functions for linear mixed-effects models as implemented in the R package 'lmerTest' (Kuznetsova et al., 2016). Mixed-effects models differ from (traditional) fixed-effects models in that some of the residual error is attributed to the influence of noise factors in a given experiment, such as differences in measurement environment or participants, and accounted for by additional coefficients included in the model. While these so-called random factors are normally uninteresting for the purposes of study, their influence may nonetheless be significant and, if not controlled for, may potentially interfere with or mask patterns in the effects of fixed factors (e.g. Johnson, 2009, 363-365). If not explicitly stated otherwise, all mixed-effects models in this study were constructed to account for the effects of two random factors, speaker and word, and all possible random slopes were specified as long as the model did not fail to converge. The fixed factors included in each of these models depended on the hypotheses tested and were specified individually in the analysis sections. Reported p-values for the fixed effects derive from incremental F tests with Satterthwaite approximation estimates of denominator degrees of freedom.

The default strategy for performing post-hoc tests following significant interactions is the analysis of simple (main) effects, whereby multiple contrasts between factor levels are evaluated: The effect of one factor is observed at fixed values for all other factors involved in an interaction, usually with correction of the p-value in order to maintain the family-wise error rate (De Rosario-Martínez, 2015a, 6). This procedure has been criticised for mixing interaction effects with main effects (or lower-order interactions within) (Marascuilo and Levin, 1970; Graham, 2000), but in light of the principle of marginality, which states that lower-order effects are marginal to the interactions they are involved in, the presence of an interaction can be considered to render the individual effects of contributing factors meaningless, so that they are "absorbed by the interaction" (De Rosario-Martínez, 2015a, 7), as it were. When interpreting the outcome of an analysis of simple effects for a significant interaction term $A \times B$, it is crucial to keep in mind that simple effects tests only show whether of not the effect of A is significant at each level of B (or vice versa), but not whether the effect of A is different at different levels of B. It is, however, not necessarily the case that a simple combination of A and B is responsible for significant interaction; rather, the interaction effect is attributable to the joint effect of A and B, which may or may not be detected when simple differences between cell means are examined (Marascuilo and Levin, 1970, 398-406).

An alternative approach to post-hoc analysis is the study of interaction contrasts. If an interaction has more than one degree of freedom, smaller component interactions can be extracted and tested to pinpoint the source(s) of the overall interaction. Interaction contrasts are defined as differential effects or 'contrasts between contrasts', that is as interaction components with all involved factors viewed as contrasts. For an interaction $A \times B$, interaction contrasts basically consist in crossing the contrasts between levels of A with the contrasts between levels of B (De Rosario-Martínez, 2015a, 9). The main advantage of this post-hoc procedure is that the hypothesis tested is not affected by the coefficients of main effects, as it directly addresses interaction (Marascuilo and Levin, 1970).

The post-hoc analysis of interactions remains a controversial issue and no universally preferred procedure has been proposed so far. De Rosario-Martínez (2015a) argued that consensus about the invariably 'best' procedure is unlikely to be achieved: "A general valid procedure is not possible in the first place, since the correct test depends on the specific problem addressed by the experiment" (1). It is, thus, a matter of how the researcher is disposed to interpret a given interaction effect and which aspect(s) the experiment was designed to focus on. Meyer (1991, 573) took a similarly utilitarian stance when he maintained that researchers should report any tests they deem useful in interpreting an interaction, as long as significance levels are adjusted for multiplicity. Most post-hoc tests performed in this study were based on an analysis of simple main effects with tools provided by the R package 'phia' (De Rosario-Martínez, 2015b). P-values were derived from multiple X^2-tests and adjusted using the sequentially rejective procedure designed by Holm (1979). Keeping in mind the caveats concerning the validity of the simple main effects method, results should be interpreted with caution; specifically, insignificant results of pairwise comparisons should not be interpreted as potentially invalidating earlier findings of significant interactions. In some cases, the analysis of simple main effects was supplemented by an analysis of (partial) interaction contrasts, also as implemented in 'phia' (De Rosario-Martínez, 2015b).

Chapter 4

Diphthongs

This chapter is concerned with the acoustic analysis of diphthongs and potential diphthongs in urban Bahamian speech. Section 4.1 will take a look at the variably monophthongal and diphthongal realisations of FACE and GOAT, section 4.2 will present an analysis of MOUTH and PRICE, and section 4.3 will focus on NURSE and CHOICE. For each analysis section, background information is provided on the lexical sets involved, on the proposed realisation of associated vowel categories in Bahamian and related varieties, and on prior research which motivated and guided the individual analyses.

4.1 FACE and GOAT

Wells (1982, 141-142) defines the standard lexical set FACE as comprising those words whose citation form in RP and GenAm has the stressed vowel /eɪ/. Phonetically, /eɪ/ is usually described as an unrounded, narrow front closing diphthong, but in unstressed syllables monophthongal variants may occur. The FACE vowel was traditionally referred to as 'long A', as it derives in most cases via the Great Vowel Shift (GVS) from Middle English /aː/ in words such as *tape, bathe* and *lady.* Other origins include Middle English /ɛː/ in those words that were exempted from merging with FLEECE, for example *great* and *steak*, and the Middle English diphthong /æi ~ ɛi/ in words such as *wait, pain* and *beige*, which had lost its diphthongal quality by the beginning of the eighteenth century and merged with then still monophthongal

FACE (Wells, 1982, 192-196). The lexical set GOAT is used to refer to those words whose citation form has the stressed vowel /əʊ/ in RP and /o/ in GenAm (Wells, 1982, 146-147). Phonetically, GenAm /o/ is a back half-close rounded monophthong or a narrow closing diphthong [o ~ oʊ], whereas in RP /əʊ/ is typically realised with a mid central unrounded starting point. The GOAT vowel derives in most cases via the GVS from Middle English /ɔː/ in words like *soap, note* and *toe*, hence its traditional name 'long O'. It also emerged from Middle English /ɔu/ in words like *know* and *soul*, which, similar to the development of Middle English /æi ~ ɛi/, had lost its diphthongality and merged with GOAT during the eighteenth century.

FACE and GOAT are often discussed as mirror images of each other and display parallel developments in many varieties of English. In a number of northern varieties of the UK and the US, for instance, FACE and GOAT are variably produced as monophthongs close to [eː] and [oː], respectively (Wells, 1982, 382, 407, 497). This is also typical of many African and Asian postcolonial varieties of English as well as English-lexifier Atlantic creoles (see e.g. Wassink, 2001; Deterding, 2000; Hoffmann, 2011). Diphthongal realisations, however, are not usually symmetrical. In southern hemisphere varieties (Wells, 1982, 597, 609, 614), FACE may be produced as a wide diphthong with a considerably lowered onset /ɛi ~ æi ~ ʌi/ (for Australian English, see e.g. Harrington et al., 1997). GOAT, on the other hand, is frequently characterised by fronting of either or both nucleus and glide (Wells, 1982, 146, 237-238).

4.1.1 FACE and GOAT in Bahamian varieties

Table 4.1 lists the vowel qualities of BahC as proposed by Wells (1982), Holm and Shilling (1982) (HS), and Childs and Wolfram (2004) (CW), comparing them to variants in a selection of associated varieties (Edwards, 2004; Blake, 2004; Devonish and Harry, 2004; Weldon, 2004; Youssef and James, 2004; Thomas and Bailey, 1998). Both Wells and HS, their reports published in 1982, describe Bahamian FACE and GOAT as monophthongal vowels [eː] and [oː]. These correspond closely to realisations in Gullah and in other creole languages in the Caribbean, though among the latter downgliding variants may also be found, which have not been reported for the Bahamian context.

Thomas and Bailey (1998, 271-278) point out that monophthongal variants also used to be prevalent in earlier southern black speech in the US, arguing for shared

Table 4.1: Suggested vowel qualities in BahC and associated varieties.

	Bahamian Creole			Caribbean varieties			US varieties	
Lexical set	Wells	HS	CW	Bajan	TrinC	JamC	Gullah	AAVE
FACE	eː	eː	ei	ɛː ~ iɛ ~ eː ~ ei	e(ː)	eː ~ ie	e	(eː ~) eɪ
GOAT	oː	oː	ou	oː ~ oə	o(ː)	oː ~ uo	o ~ oɛ	(oː ~) ou

substrate influence on AAVE and Atlantic English-based creoles (see section 4.1.2). They maintain, however, that monophthongal FACE and GOAT have been on the decline since the beginning of the twentieth century and are, indeed, all but moribund as features of present-day AAVE. More recent reports of BahC and BahE by Childs and Wolfram (2004) and Childs et al. (2003) claim that a similar development has taken place in the Bahamas and that the majority of speakers today produce narrow upgliding diphthongs rather than monophthongs. This would indicate that Bahamian productions are more like American English and less like creolised varieties of Caribbean English. A point in favour of this interpretation is the observation by Childs and Wolfram (2004, 440) that the ethnic distribution of back-vowel fronting in Southern US GOAT[1], where the vowel is typically fronted in white speech but non-fronted in black speech, is also replicated in the Bahamian context. It should be noted, however, that diphthongal variants, while not characteristic of basilectal forms, can certainly be found in acrolectal Caribbean varieties and in intermediate creoles such as Bajan. In such cases, social variation is usually implied as [ei] and [ou] are associated with educated and formal speech.

While most of the discussion of FACE and GOAT in the literature on BahC has centred on the extent of gliding movement, some comments have also been made with regard to possible variation in the position of the vowels in speakers' vowel spaces. Glinton-Meicholas (2000, 2), for instance, in a brief treatise of the oral tradition of the Bahamas, remarks on regional variants of the vowel in the word *rain* found on different islands of the Bahamian archipelago: "Many Bahamians voice it as a long 'a'. For others, the people of Andros in particular, 'rain' rhymes with 'seen', and for Cat Islanders, it echoes 'men', except the vowel sound is of slightly longer duration." Donnelly (1997, 23) claims that there is indeed a lack of contrast between /e/ and /i/, whereby "the upper vowel prevails", but only for basilectal speakers and in contexts preceding labial or alveolar nasals as in *same* –

[1]The same ethnic distribution is also said to characterise the vowel in GOOSE and, according to Thomas and Bailey (1998), the vowel in MOUTH.

seem and *main* – *mean*. She argues that this is also true for the vowels in words like *home* – *whom* and *moan* – *moon*, where /o/ supposedly merges with /u/. Shilling (1980, 141), apparently, disagrees, maintaining that the vowel in the word *same* is invariably realised as [e] in BahC.

4.1.2 Monophthongisation of FACE and GOAT

While diverging claims can be found in the literature on BahC concerning the realisation of FACE and GOAT, all authors implicitly agree that monophthongal variants in the Caribbean context are to be interpreted as creole features. In light of the wide distribution of monophthongal realisations in non-creolised varieties of English world-wide, this assumption seems somewhat unexpected and will be substantiated or qualified as necessary below. Section 4.1.2.2 will consider contextual factors that have been observed to affect the spectral shape of FACE and GOAT.

4.1.2.1 Monophthongisation - a creole feature?

While extensive substrate influence on creole phonology has been assumed since the mid 19th century and has never been seriously challenged, the origin of phonological features has remained somewhat elusive as it is usually difficult to tease apart substrate from superstrate influence, universals of second language acquisition, adstrate borrowing and internal innovations. Phonological changes induced by language contact can result in transfer, whereby speakers identify a phoneme in the second language with one of their first language(s) and subject it to the latter's phonetic rules. The likelihood of such change, however, is greater when both substrate influence and universal tendencies converge. An added complication is the scarce supply of detailed information about the phonologies of superstrate founder varieties that contributed to the initial componential matrix, to say nothing about the utter lack of documentation of the relevant substrate languages (e.g. Holm, 2000, 137-139). In the case of FACE and GOAT, there are two basic scenarios that could have lead to the present distribution of monophthongal variants in dialectal and creole varieties of North America and the Caribbean.

Following Kurath and McDavid (1961, vi), who posit that phonological variation in American dialects today derives primarily from dialects of the British Isles, monophthongal variants [eː] and [oː] in North America might be considered reflexes of speech patterns prevalent in the early white settler population. According to Wells (1982, 210-211), Long Mid Diphthonging of FACE and GOAT started around 1800 in the precursor of RP. Although American English had probably been established as a distinct accent before that, he argues that British influence continued to be felt well after American Independence and it remains inconclusive how far diphthongal FACE and GOAT constitute part of the shared history of RP and GenAm. Of course, even if diphthongal variants where inherited by GenAm before the two standard accents diverged, present-day monophthongs in FACE and GOAT could still have derived from other, more conservative regional dialects imported by British settlers throughout the eighteenth and nineteenth centuries. The most likely source of monophthongal variants would presumably be the speech of Scottish-Irish settlers. FACE and GOAT are monophthongal in present-day Ulster Scots (Wells, 1982, 440), and it is assumed that they were also monophthongal at the time of American colonisation. Given the large number of Scottish-Irish immigrants, constituting the second largest national group in colonial America after the English (Crozier, 1984, 310), it is not inconceivable that these speakers may have had a lasting effect on FACE and GOAT vowels, even in regions as diverse as Newfoundland, Minnesota, Louisiana and the Caribbean.

This is, however, precisely where Thomas and Bailey (1998) disagree (also see discussion in Thomas, 2001, 17-18, 30-32). They argue that a Scottish-Irish source, or any other British source, for that matter, could not account for the social, ethnic and spatial distribution of monophthongal variants in American varieties of English. Based on data in the LAMSAS records, the Linguistic Atlas of the Middle and South Atlantic States, and acoustic analyses of interview recordings of four black and three white speakers born between 1844 and 1859, Thomas and Bailey (1998, 270-278, 282-287) show that this feature was much more common in early AAVE than in white speech. When monophthongal or associated ingliding variants did occur in productions of white speakers, they tended to be most prominent in areas once dominated by plantation culture and, consequently, where the largest proportion of African Americans lived such as in the Low Country of coastal South Carolina and Georgia. In inland areas primarily settled by Ulster Scots, monophthongal FACE and GOAT were rare, suggesting a kind of "complemetary distribution" (Thomas and Bailey, 1998, 283) of monophthongal FACE/GOAT and Scottish-Irish population. Thomas and Bailey (1998) consequently argue that monophthongisation and, occasionally, subsequent ingliding occurred after settlement and spread from black to white speech in contexts of close contact between the ethnic groups.

Today, the use of monophthongal variants in FACE and GOAT is rapidly declining among both AAVE speakers and white speakers in the Low Country, but it is still a very vital feature of Caribbean English-based creoles. The ethnic distribution of early monophthongisation in North America in conjunction with the overall scarcity of diphthongs in African vowel systems makes for an attractive argument in favour of substrate influence during creole formation. There are, however, a range of regions in the United States where monophthongal variants prevail even though African Americans and Scottish-Irish settlers both constitute a minority. Minnesota and adjacent states were settled largely by Germans and Scandinavians, Pennsylvania by Germans, and Louisiana by the French. Monophthongisation is also found among Hispanic groups, Japanese Americans in California and speakers in Irish-influenced Newfoundland. What these varieties have in common is a shared history of extended language contact (Thomas, 2001, 17-18, 30-31), where substrate influence presumably converged with the preference for the retention of more unmarked monophthongs instead of the adoption of more marked diphthongs in the process of group second language acquisition. This developmental profile would also fit the descriptions of FACE and GOAT in many postcolonial varieties around the world, though it may be difficult to make a conclusive case for monophthongal variants in the British Isles as essentially deriving from language contact with Celtic languages.

Either way, whether monophthongisation of FACE and GOAT is primarily a substrate feature or whether it derives from universal processes of second language acquisition, monophthongal variants in Caribbean varieties of English may be considered language contact phenomena and, as such, creole features. The sociolinguistic distribution of ingliding, monophthongal and upgliding variants reported for some Caribbean speech communities seems to support this assumption. In Bajan, the creole spoken in Barbados, FACE is generally realised as monophthongal [eː], but Blake (2004, 316) claims that Long Mid Diphthonging has become productive in the speech of urban, educated speakers, adding a closing offglide to the long mid vowel. Among rural and less educated speakers, FACE may be manifested as lower monophthongal [ɛː] or downgliding [ɪɛ]. Blake (2004) does not mention an analogous pattern of variation for GOAT. In the more radical creole of Jamaica, social variation involves primarily an alternation between in- or downgliding and monophthongal variants rather than between monophthongal and upgliding variants. Downgliding in FACE and GOAT apparently constitutes a development subsequent to monophthongisation (Thomas, 2001, 18, 32) and the resulting forms [ie] and [uo] are locally stigmatised. Examining the productions of 19 JamC speakers, Wassink (1999a, 2001) found that acrolect-dominant speakers displayed a clear preference for monophthongal tokens in all analysed speech styles. Basilect-dominant speakers primarily used downgliding variants in the conversational setting but approximated their speech to that of the acrolect-dominant speakers when called on to produce careful speech. Overall, stylistic variation was greater among females, and downgliding in GOAT appeared to be more stigmatised than in FACE. While Beckford Wassink did not focus on the distribution of upgliding variants, she explicitly (Wassink, 1999a, 104-105) or implicitly (Wassink, 2001, 152-155) acknowledged that these do occur and, for the sake of analysis, they were grouped with monophthongal tokens. She also mentioned that upgliding variants may be found in hypercorrected speech or when speakers try to imitate or mimic American English (Wassink, 1999a, 241-244). Irvine (2004, 2008) addressed variation within acrolectal productions of educated speakers in formal situations and was able to reproduce some of Beckford Wassink's findings, specifically the avoidance of downgliding variants in formal acrolectal speech and the somewhat more pronounced stigmatisation of [uo] compared to [ie]. She argued that the absence of downglides in FACE and GOAT is a "load-bearing" (Irvine, 2008, 18-19) structure of Jamaican English, which means that it is clearly identified by Jamaican speakers and overtly evaluated as a crucial and necessary feature of the acrolect.

4.1.2.2 Contextual factors influencing monophthongisation

According to Wells (1982, 211), monophthongal FACE and GOAT in Minnesota and surrounding states are particularly common in the environment of a following voiceless consonant as in *gate* and *soap*, where their duration is also reduced to half-long [eˑ] and [oˑ]. While this might be attributed to truncation in contexts of pre-voiceless shortening, Gay (1968, 1571-1572) showed that the effect of voicing on vowel duration was generally smaller in /eɪ/ and /oʊ/ than in wider diphthongs and almost negligible compared to the effect of speech rate. Moreover, this view seems to be at odds with findings by Moreton (2004), who showed that tokens of FACE may actually display extended gliding movements in pre-voiceless contexts. Based on an acoustic analysis of the diphthongs /aɪ, ɔɪ, eɪ, aʊ/ in recordings of minimal or near-minimal pairs read by sixteen American students, mostly from the eastern US, Moreton (2004, 5-13) demonstrated that pre-voiceless offglides were significantly raised and peripheralised in all four diphthongs. While the same tendency could be observed for pre-voiceless nuclei in /aɪ, aʊ/ (see section 4.2 on voicing-conditioned variation in MOUTH and PRICE), this was not the case for nuclei in /eɪ, ɔɪ/, which effectively caused an increase in gliding movement in pre-voiceless contexts in these diphthongs. Moreton (2004, 10-11) did mention, however, that nuclear within-speaker variability was "unusually large" for /eɪ/, presumably due to the influence of preceding consonants, since /eɪ/ "typically has a very early F1 maximum".

Moreton (2004, 12-13) hypothesised that peripheralisation of the offglide in closing diphthongs is an instance of hyperarticulation and associated with the realisation of the postvocalic voicing contrast. He argued that articulatory gestures for voiceless obstruents are more forceful than for voiced obstruents. The facilitation of the consonant gesture then spreads to the neighbouring vocalic portion, causing hyperarticulation towards the end of the preceding vowel, which translates to more peripheral offglides in closing diphthongs. Any differences in the nucleus, which may or may not accompany differences in the glide, are then to be interpreted as secondary, arising from subsequent coarticulation. The principal effect of voicelessness occurs on vowel termination and, if it is transmitted to earlier portions in the vowel, spectral change in the nucleus will reflect the pattern displayed in the glide (also see section 4.2.2.3). The asymmetry of the voicing effect in that hyperarticulation spreads to preceding rather than to following vowels could be accounted for by the need to accommodate to higher oral air pressure during the closing phase of a consonant gesture, which does not occur during release (Moreton, 2004, 29). Whether the observed spectral differences in the offglides of closing diphthongs are indeed caused by phonetic processes directly associated with the postvocalic voicing contrast or not, it appears that listeners can access these differences and use them as cues to voicing. In two lexical decision experiments involving the diphthongs [aɪ] and [eɪ], participants showed to be more likely to identify coda consonants as voiceless as the acoustic peripheralisation of offglides increased (Moreton, 2004, 13-24).

An attempt to reconcile Wells' (1982) proposition above with the findings by Moreton (2004; also see Thomas, 2000) seems unlikely to be met with success. Of course, vocalic hyperarticulation may not actually be a universal correlate of coda voicelessness, or at least it may be more pronounced in varieties where speakers and listeners depend more on vocalic perceptual cues in the identification of following obstruents. It is conceivable that relatively robust offglide spectral differences help compensate for any averse effects on perception caused by, for instance, low release rates in stop consonants. In black Bahamian speech, high levels of consonant cluster reduction and final consonant deletion are a regular occurrence in all phonological and morphological contexts (e.g. Childs et al., 2003; Childs and Wolfram, 2004). In the absence of evidence or even suggestions to the contrary, cues to coda voicing, if indeed encoded in the spectral shape of FACE and GOAT, may therefore be expected to follow the pattern described by Moreton (2004).

4.1.3 Research questions and hypotheses

Based on the background of FACE and GOAT in the Bahamian context reported above, the following hypotheses and research questions may be derived.

1. Glides in both FACE and GOAT will be higher and more peripheral in pre-voiceless than in pre-voiced contexts.

2. Overall gliding movement will be extended in pre-voiceless contexts or nuclei will have shifted in the same direction as glides.

3. More monophthongal variants will be found in the conversational data collected in the late 1990s than in the map task and citation form data collected in 2014.

4. Truncation due to increased speech rate is also likely to affect productions of FACE and GOAT in the map task setting compared to citation forms.

5. If monophthongisation of FACE and/or GOAT is socially diagnostic in the Bahamian context, more monophthongal variants, associated with BahC, will be found among lower-class than higher-class speakers. Stigmatisation of creole features may also add to the stylistic variation exhibited in that more diphthongal forms are produced in tasks that call for more formal speech.

4.1.4 Analysis procedure

All acoustic analyses were restricted to vowels in maximally bisyllabic words and with durations of minimally 75 ms. Only vowels in CVC contexts were selected from the map task and citation form datasets. For FACE and GOAT in conversational speech, word-final contexts were included but treated separately. All word-final contexts were also phrase-final. Pre-nasal and pre-liquid contexts were avoided as well as tokens following /r/ or semivowels. Tokens followed by /t/ in potential t-flapping contexts were removed from the datasets. The data collected in the map task and citation form setting consisted exclusively of vowels followed by alveolar obstruents. A total of 1520 tokens were finally subjected to further analysis, 818 for FACE and 702 for GOAT. Table 4.2 lists the token numbers for each lexical set, following voicing context and speech style.

Table 4.2: Number of tokens for acoustic analyses by lexical set, voicing context and speech style

Lexical set	**Voicing context**	**Conversational**	**Map task**	**Citation form**
FACE	Pre-voiced	93	81	174
	Pre-voiceless	165	102	166
	Word-final	37	–	–
GOAT	Pre-voiced	33	89	169
	Pre-voiceless	86	95	158
	Word-final	72	–	–
Total		486	367	667

Two measures, *EDcentroid* and *ED*, were calculated in order to address the hypotheses listed in section 4.1.3. To test for the effect of following voicing context on the relative position of FACE and GOAT in speakers' vowel spaces, the degree of peripheralisation of the vowels at various time points was quantified in terms of Euclidean distances to speaker-specific vowel space centroids. For each speaker, F1' and F2' means based on normalised frequency values were calculated for the lexical sets FLEECE, DRESS, TRAP, BATH, THOUGHT, and GOOSE, chosen to represent a sample of monophthongal vowels positioned along the perimeters of vowel space which is maximally balanced with respect to the front/back and high/low dimensions. A speaker's centroid C was defined as the mean F1' and F2' of the mean formant values of these six lexical sets (see 4.1). *EDcentroid* values were then calculated for each time point at 10%-intervals between 20% and 80%

into a given vowel token v_i as the Euclidean distance between F1' and F2' at that point in time and C (see 4.2).

$$C_{Fn} = \frac{FLEECEmean_{Fn} + ... + GOOSEmean_{Fn}}{6} \tag{4.1}$$

$$EDcentroid_{v_i} = \sqrt{(v_{i,F1} - C_{F1})^2 + (v_{i,F2} - C_{F2})^2} \tag{4.2}$$

EDcentroid values were used to assess the diverging effect the following voicing context may have on the beginning and end portion of FACE and GOAT. All other analyses dealt more directly with the extent of gliding movement quantified as *ED*, the Euclidean distance between nucleus and glide in a given vowel token; nucleus and glide were defined as 20% and 80% into the vowel, respectively.

4.1.5 Results

4.1.5.1 Visual inspection

Figure 4.1 illustrates the spectral movement of the vowels in FACE and GOAT in normalised F1×F2 formant space for three speakers and speech styles. Measurements were extracted at 10% intervals from 20% to 80% into vowel tokens and the trajectories were smoothed for each speaker, style and voicing context prior to plotting.

From the top row in figure 4.1 it would seem that overall gliding movement in FACE and GOAT is extended in the citation form data compared to the other two tasks. However, between-speaker variation is extensive and the difference observed across tasks is vanishingly small compared to the difference conditioned by the following voicing context as illustrated in the bottom row: Pre-voiced contexts show to be fairly monophthongal for all speakers and tasks, while pre-voiceless contexts display a diphthongal quality to varying degrees. Tokens characterised by a distinct spectral movement are almost invariably upward-gliding. In addition, tokens of FACE tend to move to a more front position.

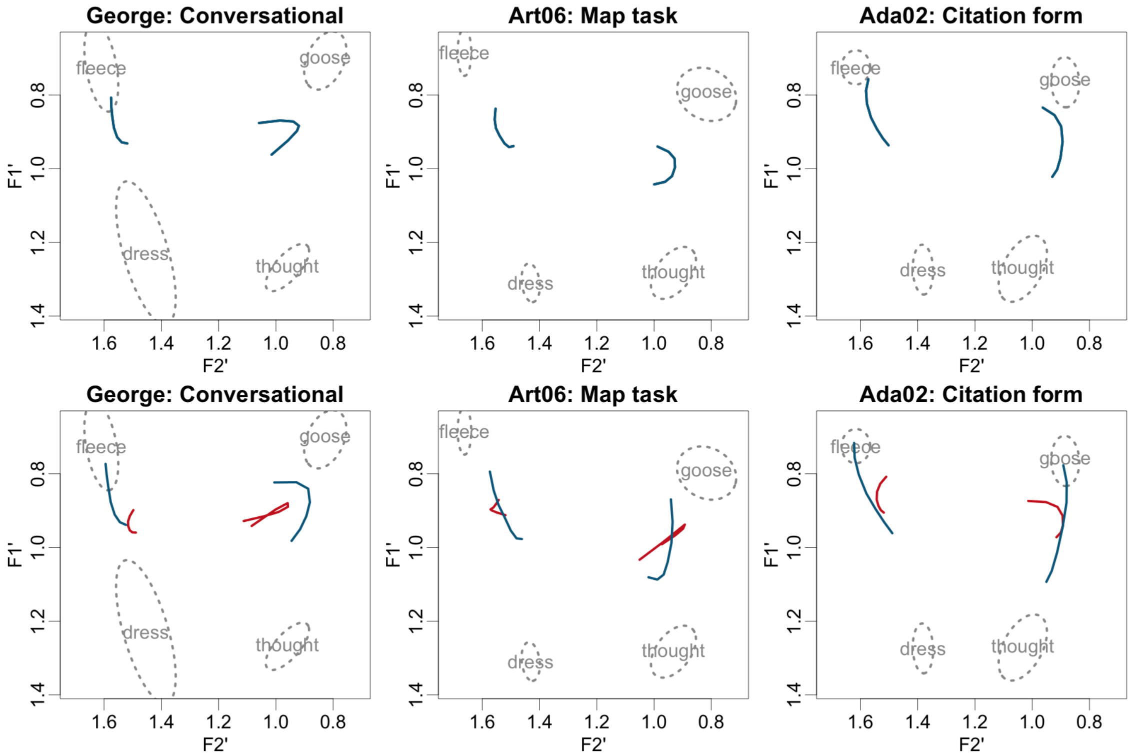

Figure 4.1: Smoothed formant trajectories (F1', F2') of FACE and GOAT for three speakers and speech styles; top row: all tokens considered jointly; bottom row: tokens separated by following voicing context (red for pre-voiced, blue for pre-voiceless)

4.1.5.2 Variation across tasks: *EDcentroid*

FACE Figure 4.2 below displays *EDcentroid* measures for pre-voiced and pre-voiceless tokens of FACE at 10%-intervals through the vowel. Each panel presents the aggregated measures for one speech style. Only non-word-final tokens were included. As expected, pre-voiceless tokens exhibit a pattern quite distinct from pre-voiced tokens in that the spectral movement from a more central to a more peripheral position is more pronounced. This is especially obvious in the map task and citation form data. In contrary to what Moreton (2004, 12-13) predicted, nuclei in pre-voiceless contexts do not appear to follow in the direction of the shift of pre-voiceless glides but instead are found in a more central position than their pre-voiced counterparts, further extending the degree of gliding movement. The main difference across datasets seems to be the overall more central location of FACE in all voicing contexts in the conversational setting, where pre-voiceless and pre-voiced tokens appear to approximate each other. The tokens of FACE which on average display the greatest degree of spectral movement are found in pre-voiceless contexts in the citation form data, where glides are characterised by a high degree of peripheralisation. Word-final tokens were excluded from plotting and statistical testing, but their observed mean values at nucleus and glide are listed in table 4.3 along with those in the other contexts. On average, word-final tokens in the conversational data had a more central nucleus than both pre-voiced and pre-voiceless tokens and a glide which was about as peripheral as in pre-voiceless contexts; word-final FACE, thus, displayed more overall gliding movement than FACE followed by a tautosyllabic consonant.

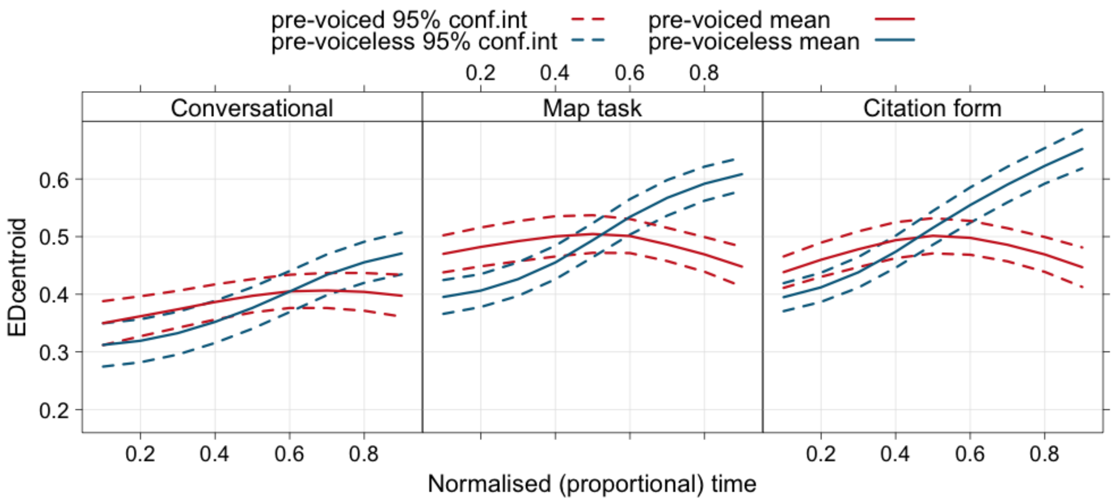

Figure 4.2: *EDcentroid* measures across time for FACE by voicing context and speech style; means and confidence intervals derived from smoothed speaker values

Table 4.3: *EDcentroid* means and standard deviations for FACE at two time points by voicing context and task; values derived from all observed tokens

Time point	Voicing context	Conversational	Map task	Citation form
Nucleus	Pre-voiced	0.35 (0.08)	0.47 (0.06)	0.46 (0.08)
	Pre-voiceless	0.33 (0.09)	0.40 (0.10)	0.41 (0.08)
	Word-final	0.28 (0.07)	–	–
Glide	Pre-voiced	0.40 (0.09)	0.46 (0.09)	0.46 (0.09)
	Pre-voiceless	0.47 (0.10)	0.58 (0.09)	0.62 (0.08)
	Word-final	0.46 (0.10)	–	–

A mixed-effects model analysis was performed for *EDcentroid* measures at two time points, nucleus and glide, defined as 20% and 80% into the vowel. The other fixed factors included in the model were speech style (conversational, map task, citation form) and following voicing context (pre-voiced, pre-voiceless). The test revealed significant main effects for time point and style, and significant two-way interactions between all fixed factor pairings (see table 4.4). Significant results of subsequent post-hoc tests are summarised in table 4.5.

Table 4.4: Mixed model analysis results: *EDcentroid* in FACE by time point (nucleus, glide), voicing context (pre-voiced, pre-voiceless) and speech style (conversational, map task, citation form)

Dependent variable **Significant factors**	**F**	**(df)**	**p-value**	
EDcentroid				
Time point	69.7	$(1, 62.2)$	< 0.001	***
Style	13.0	$(2, 98.8)$	< 0.001	***
Time point : Voicing context	54.1	$(1, 75.3)$	< 0.001	***
Time point : Style	4.2	$(2, 137.2)$	< 0.05	*
Voicing context : Style	3.9	$(2, 185.6)$	< 0.05	*

Overall, that is across both voicing contexts, the glide in FACE was significantly more peripheral than the nucleus in all three speech styles. However, across all speech styles, the difference between glide and nucleus was only significant in pre-voiceless contexts. In pre-voiceless contexts, the glide was more peripheral and the nucleus was more central than in pre-voiced contexts. In pre-voiced contexts, the vowel in FACE was more central in the conversational data than in the map task and citation form data; in pre-voiceless contexts, the vowel in FACE was more central in the conversational and map task data than in the citation form data. Across both voicing contexts, the glide was more central in the conversational and map task data than in the citation form data; the nucleus was more central in the conversational data than in the map task data, where, in turn, the nucleus was more central than in the citation form data. In addition to an analysis of simple main effects, simple interaction effects were tested for the interaction between time point and speech style. These showed that the contrast between nucleus and glide was significantly smaller in the map task data compared to the citation form data ($coef = 0.03; chisq = 8.4; p < 0.05$).

Table 4.5: Post-hoc test results: Analysis of simple main effects for interaction terms in table 4.4 for dependent variable F1'

Main effect: contrasted levels **Context of significant contrasts**	**Coef.**	**Chisq(df=1)**	**p-value**	
Time point: glide – nucleus				
pre-voiceless	0.16	135.9	< 0.001	***
conversational	0.09	56.5	< 0.001	***
map task	0.08	23.1	< 0.001	***
citation form	0.10	47.2	< 0.001	***
Voicing context: pre-voiced – pre-voiceless				
glide	−0.08	22.6	< 0.001	***
nucleus	0.06	17.1	< 0.001	***
Style: conversational – map task				
nucleus	−0.06	8.0	< 0.05	*
pre-voiced	−0.07	10.3	< 0.05	*
Style: conversational – citation form				
glide	−0.08	15.4	< 0.01	**
nucleus	−0.07	8.9	< 0.05	*
pre-voiced	−0.08	12.2	< 0.01	**
pre-voiceless	−0.07	9.5	< 0.05	*
Style: map task – citation form				
glide	−0.03	21.6	< 0.001	***
pre-voiceless	−0.03	21.2	< 0.001	***

GOAT Figure 4.3 presents *EDcentroid* measures at 10% intervals through the vowel in GOAT by speech style and voicing context, excluding word-final contexts. The pattern displayed by GOAT resembles that observed for FACE in many ways. Pre-voiceless contexts exhibit greater overall gliding movement due to peripheralisation of pre-voiceless glides. In citation form, pre-voiceless GOAT is additionally characterised by more central nuclei. The difference across styles may be more pronounced in GOAT than in FACE, as pre-voiceless spectral movement seems to decrease stepwise from right to left: In the map task, this is presumably caused by a much lower degree of centralisation of pre-voiceless nuclei, while conversational tokens also show less differentiation between pre-voiced and pre-voiceless glides, leading to close approximation of GOAT in the two voicing contexts. As with FACE, conversational tokens of GOAT are more central overall compared to the other datasets. Pre-voiced tokens also show considerable spectral change throughout the course of the vowel, but their trajectory is clearly of a concave shape. For map task and citation form settings, the slope is particularly steep towards the end of the vowel, which is presumably caused by the place of articulation of the following consonant: In all elicited target words, GOAT was immediately followed by a coronal consonant, which leads to fronting in back vowels and, thus, to more central positions of glides in GOAT. As in the analysis of FACE above, word-final tokens were excluded from plotting and statistical testing, but their observed mean values at nucleus and glide are listed in table 4.6 along with those in the other contexts. On average, word-final tokens in the conversational data had a more central nucleus than both pre-voiced and pre-voiceless tokens and a glide which was about as peripheral as in pre-voiceless contexts; word-final GOAT, thus, displayed more overall gliding movement than GOAT followed by a tautosyllabic consonant.

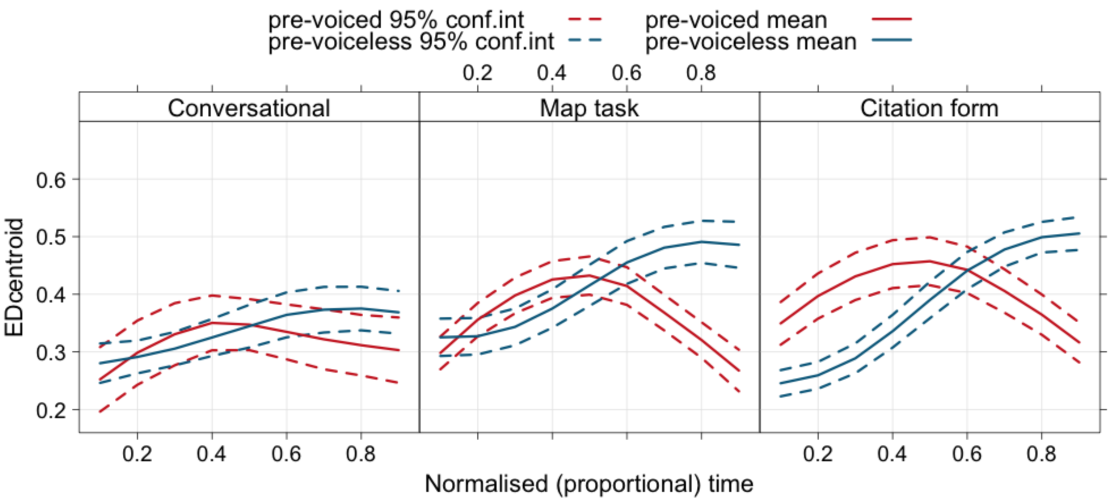

Figure 4.3: *EDcentroid* measures across time for GOAT by voicing context and task; means and confidence intervals derived from smoothed speaker values

Table 4.6: *EDcentroid* means and standard deviations for GOAT at two time points by voicing context and task; values derived from all observed tokens

Time point	Voicing context	Conversational	Map task	Citation form
Nucleus	Pre-voiced	0.27 (0.11)	0.34 (0.09)	0.39 (0.10)
	Pre-voiceless	0.30 (0.10)	0.33 (0.08)	0.25 (0.09)
	Word-final	0.18 (0.11)	–	–
Glide	Pre-voiced	0.30 (0.10)	0.29 (0.09)	0.35 (0.10)
	Pre-voiceless	0.38 (0.11)	0.49 (0.10)	0.50 (0.10)
	Word-final	0.38 (0.10)	–	–

In order to test the observations above, a mixed-effects model analysis was performed on *EDcentroid* measures at nucleus and glide, defined as the points at 20% and 80% into the vowel. As for the analysis of FACE, fixed factors were specified as time point, voicing context and style. The analysis revealed a significant three-way interaction between all fixed effects (see table 4.7) and post-hoc tests were computed (see table 4.8). These showed that, in all three speech styles, the difference between nucleus and glide was significant in pre-voiceless but not in pre-voiced contexts. The peripheralisation of pre-voiceless relative to pre-voiced glides was significant in the map task and citation form data. In citation form, pre-voiceless nuclei were also found to be significantly more central: They were more central than their pre-voiced counterparts and more central than pre-voiceless nuclei in the map task data. In the conversational data, the effect of voicing did not show to be significant, neither in nucleus nor in glide position. The approximation of the two voicing contexts in conversational speech may be caused primarily by the relatively central position of pre-voiceless glides, which was significant compared to the other two speech styles. In addition to an analysis of simple main effects, simple interaction effects were tested with fixed voicing context. These showed that, in pre-voiceless contexts, the contrast between nucleus and glide was significantly smaller in the conversational data compared to the map task ($coef = 0.08; chisq = 10.6; p < 0.01$) and citation form ($coef = 0.16; chisq = 39.8; p < 0.001$) data, and smaller in the map task compared to the citation form data ($coef = 0.08; chisq = 18.0; p < 0.001$).

Table 4.7: Mixed model analysis results: *EDcentroid* in GOAT by time point (nucleus, glide), voicing context (pre-voiced, pre-voiceless) and speech style (conversational, map task, citation form)

Dependent variable **Significant factors**	**F**	**(df)**	**p-value**	
EDcentroid				
Time point	25.0	$(1, 17.7)$	< 0.001	***
Style	4.9	$(2, 93.7)$	< 0.01	**
Time point : Voicing context	79.4	$(1, 14.4)$	< 0.001	***
Time point : Style	10.0	$(2, 62.7)$	< 0.001	***
Voicing context : Style	10.9	$(2, 93.5)$	< 0.001	***
Time point : Voicing context : Style	15.2	$(2, 59.4)$	< 0.001	***

Table 4.8: Post-hoc test results: Analysis of simple main effects for interaction terms in table 4.7 for dependent variable F1'

Main effect: contrasted levels **Context of significant contrasts**	**Coef.**	**Chisq(df=1)**	**p-value**	
Time point: glide – nucleus				
pre-voiceless, conversational	−0.09	21.1	< 0.001	***
pre-voiceless, map task	−0.17	56.7	< 0.001	***
pre-voiceless, citation form	−0.25	134.2	< 0.001	***
Voicing context: pre-voiced – pre-voiceless				
glide, map task	−0.17	45.5	< 0.001	***
glide, citation form	−0.13	34.5	< 0.001	***
nucleus, citation form	0.16	27.8	< 0.001	***
Style: conversational – map task				
glide, pre-voiceless	−0.08	16.2	< 0.001	***
Style: conversational – citation form				
glide, pre-voiceless	−0.11	26.9	< 0.001	***
Style: map task – citation form				
glide, pre-voiceless	−0.06	21.8	< 0.001	***
nucleus, pre-voiceless	0.05	17.2	< 0.001	***

4.1.5.3 Variation across tasks: *ED*

FACE As expected from the analysis of *EDcentroid* measures above, average gliding movement in FACE is smaller in pre-voiced contexts than in pre-voiceless contexts for all three tasks (see table 4.9). While the extent of gliding movement in pre-voiced contexts remains relatively constant across speech styles, it appears to increase in pre-voiceless contexts from more informal to more formal speech. Since the duration of vowels in pre-voiced contexts is consistently longer than in pre-voiceless contexts, the effect of voicing on gliding movement cannot be attributed to underlying differences in duration. As shown in table 4.9, however, the increase of pre-voiceless diphthongality in more formal speech is accompanied by a steady increase in vowel duration, presumably due to a decrease in speech rate. Consequently, an alternative interpretation of the changes in *ED* across speech styles may be that they directly reflect differences in duration, which, in turn, are correlated with differences in style. Figure 4.4 illustrates that, while the difference in gliding movement between pre-voiced and pre-voiceless contexts is fairly stable in vowels with a duration of approximately 150 ms or longer, it decreases rapidly as vowels become shorter and those in pre-voiceless contexts become more monophthongal. The filled points in the plot show that the conversational data consists almost exclusively of very short pre-voiceless vowels, which indicates that the influence of speech style may indeed mask an underlying effect of duration.

Table 4.9: Euclidean distance (ED) and duration (in ms) mean values and standard deviations for FACE; values derived from all observed tokens

Measure	Voicing context	Conversational	Map task	Citation form
ED	Pre-voiced	0.11 (0.07)	0.09 (0.05)	0.10 (0.06)
	Pre-voiceless	0.18 (0.09)	0.20 (0.10)	0.24 (0.08)
	Word-final	0.22 (0.12)	–	–
Duration	Pre-voiced	169.4 (60.3)	193.9 (58.3)	287.4 (70.8)
	Pre-voiceless	126.4 (31.3)	156.1 (35.0)	174.4 (33.9)
	Word-final	177.1 (40.9)	–	–

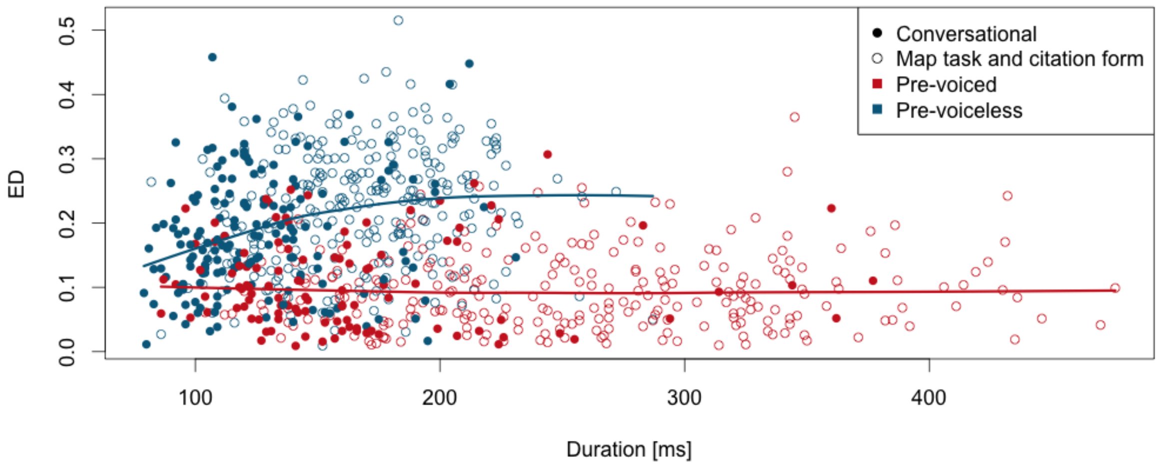

Figure 4.4: ED for FACE by duration, voicing context and task; smoothed curves based on values aggregated by speech style

A mixed-effects model analysis with dependent variable ED and fixed factors voicing context, style and duration showed that neither the effect of style, not the interaction between style and voicing context reached significance; instead, the analysis revealed a significant main effect for duration ($F[1, 545.9] = 8.2, p < 0.01$) and a significant interaction between voicing context and duration ($F[1, 511.0] = 10.6, p < 0.01$). The same model was rerun excluding all vowel tokens with durations above 275 ms in order to prevent the prediction of highly unrealistic ED values in pre-voiceless context, but the same pattern of significances persisted (see table 4.10).

This means that the slope describing the increase in ED by duration differed significantly between pre-voiced and pre-voiceless tokens, but it did so similarly in all three speech styles. Figure 4.5 illustrates this relationship based on values predicted by the final model. Post-hoc tests revealed that the adjusted slope for pre-voiced contexts did not differ significantly from zero, but the slope for pre-voiceless contexts did ($chisq = 19.4; p < 0.001$), predicting an average increase of approximately 0.05 ED units every 100 ms.

Table 4.10: Mixed model analysis results: ED in FACE by voicing context (pre-voiced, pre-voiceless), speech style (conversational, map task, citation form) and duration

Dependent variable **Significant factors**	**F**	**(df)**	**p-value**	
ED				
Duration	16.5	$(1, 637.9)$	< 0.001	***
Voicing context : Duration	5.0	$(1, 585.6)$	< 0.05	*

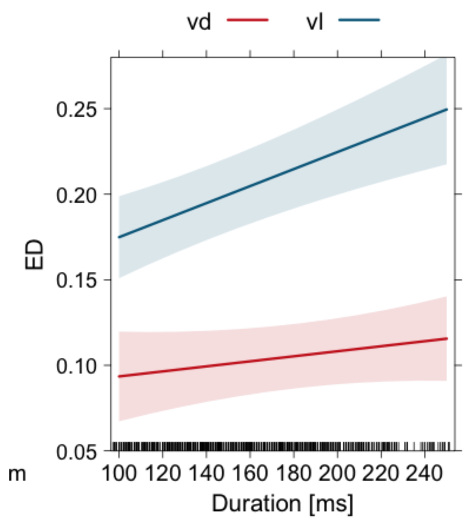

Figure 4.5: ED effects plot for FACE by voicing context and duration

GOAT At first glance, ED measurements for the vowel in GOAT (see table 4.11) show a pattern similar to the one reported for FACE. Pre-voiced contexts are characterised by shorter gliding movement and longer duration than pre-voiceless contexts in all three speech styles. Across speech styles, it is the latter contexts that display the most variability in ED. From conversational to map task to citation form data, gliding movement in pre-voiceless tokens increases on average by 0.04 and 0.07 ED units, respectively, which is more than the increase across tasks found for FACE (0.02 and 0.04 ED units). In addition, a moderate increase in ED values may also be noted for pre-voiced contexts in citation form compared to map task tokens. As with FACE, however, extended gliding movement across styles goes hand in hand with longer vowel duration and it remains to be tested whether style-based differences continue to persist if the effects of speech style and duration are considered in unison.

Table 4.11: Euclidean distance (ED) and duration (in ms) mean values and standard deviations for GOAT; values derived from all observed tokens

Measure	Context	Conversational	Map task	Citation form
ED	Pre-voiced	0.15 (0.09)	0.14 (0.07)	0.17 (0.09)
	Pre-voiceless	0.19 (0.11)	0.23 (0.10)	0.30 (0.10)
	Word-final	0.25 (0.11)	–	–
Duration	Pre-voiced	182.3 (62.0)	205.8 (59.8)	293.5 (60.7)
	Pre-voiceless	143.4 (42.9)	151.3 (26.3)	182.0 (46.7)
	Word-final	199.7 (60.9)	–	–

A mixed-effects model analysis with dependent variable ED and fixed factors voicing context, style and duration showed a significant three-way interaction between all fixed factors ($F[2, 459.0] = 10.8, p < 0.001$). Reducing the data input to tokens with durations of less or equal to 275 ms still revealed a significant interaction between the three fixed factors; the results are listed in table 4.12. The complex interaction effect as predicted by the model is displayed in figure 4.6. ED in pre-voiced tokens is relatively constant across speech styles and duration; the slight increase by duration in citation form data was not significant and the extensive variability can be attributed to the fact that there are only very few short pre-voiced tokens in this dataset (n=6 for durations below 200 ms). ED of pre-voiceless tokens differs across style in average value as well as with regard to its functional relationship with duration. Post-hoc tests showed that average ED in pre-voiceless contexts was significantly lower in conversational than in citation form productions ($coef = -0.09; chisq = 11.7; p < 0.01$). In spite of the close approximation of pre-voiced and pre-voiceless contexts in the conversational data, however, the average difference between voicing contexts was still significant in all three tasks (conversational: $coef = -0.07; chisq = 7.6; p < 0.05$; map task:

$coef = -0.14; chisq = 27.3; p < 0.001$; citation form: $coef = -0.19; chisq = 30.8; p < 0.001$). The effect of duration on the extent of gliding movement in pre-voiceless tokens seems to be particularly pronounced in the map task data, where the model predicts a significant average increase of 0.14 ED units every 100 ms ($chisq = 17.1; p < 0.001$). In the other speech styles, the increase by duration in pre-voiceless or pre-voiced GOAT was not significantly different from zero. The slope for pre-voiceless GOAT in map task style was significantly steeper than in citation form ($coef = 0.002; chisq = 17.7; p < 0.001$), while the difference to that in conversational speech just missed significance ($coef = 0.001; chisq = 7.3; p = 0.055$).

Table 4.12: Mixed model analysis results: ED in GOAT by voicing context (pre-voiced, pre-voiceless), speech style (conversational, map task, citation form) and duration

Dependent variable **Significant factors**	**F**	**(df)**	**p-value**	
ED				
Style	8.0	(2, 363.7)	< 0.001	***
Voicing context : Style	5.7	(2, 410.8)	< 0.01	**
Style : Duration	3.3	(2, 455.5)	< 0.05	*
Voicing context : Style : Duration	6.1	(2, 465.5)	< 0.01	**

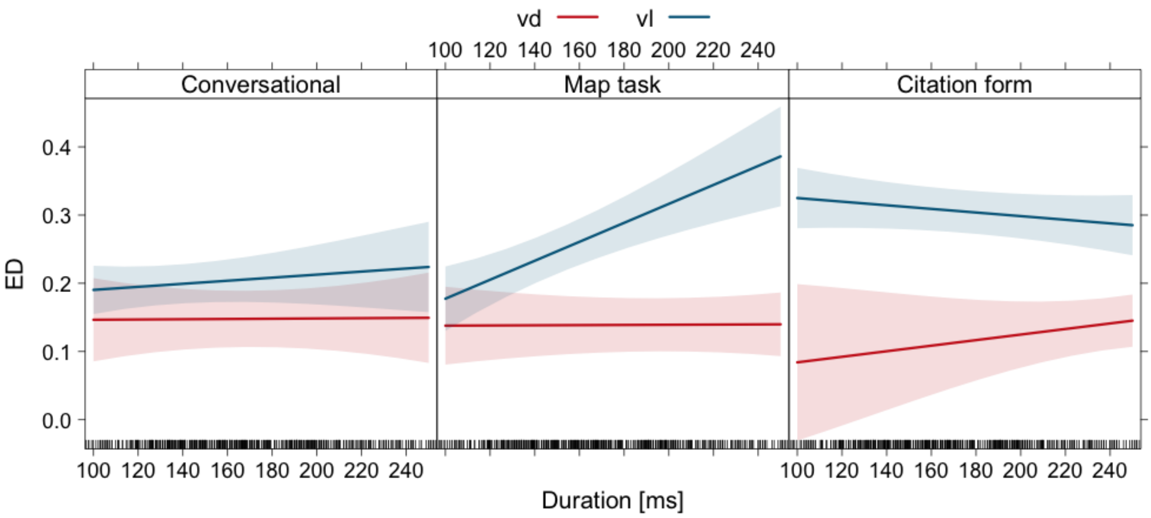

Figure 4.6: ED effects plots for GOAT by voicing context, speech style and duration

4.1.5.4 Social variation: Conversational data

FACE Figure 4.7 below illustrates the *ED* values in pre-voiced and pre-voiceless FACE recorded for speakers in the conversational dataset, further grouped by gender, social class and age. The left panel, which documents *ED* values for speakers grouped by gender, is based on productions by lower-class speakers only, because the data did not include higher-class males. As expected from the analyses in previous sections, pre-voiceless contexts consistently display more gliding movement than pre-voiced contexts, irrespective of speaker identity. Gender does not appear to influence the vowel's gliding movement, at least not for lower-class speakers. For speakers of the older age group, *ED* seems to vary with the speakers' class membership in that higher-class speakers produce higher *ED* values than lower-class speakers, a difference particularly noticeable in pre-voiceless contexts.

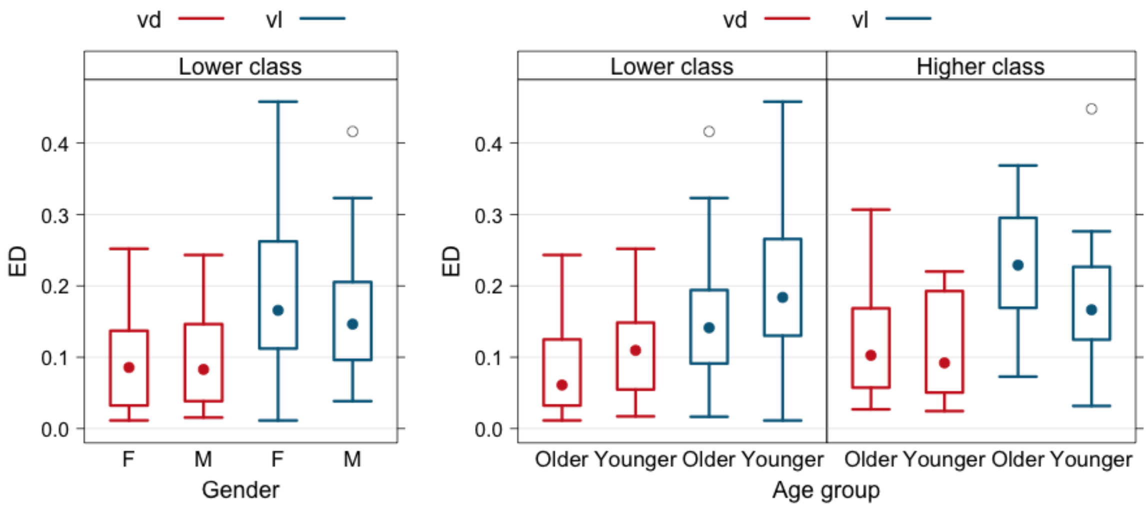

Figure 4.7: *ED* for FACE in pre-voiced and pre-voiceless contexts by speaker variables gender (left, lower-class speakers only) and social class and age group (right)

A mixed-effects model with fixed factors voicing context and gender, run on the data of lower-class speakers only, showed a highly significant effect of voicing context ($F[1, 23.1] = 14.5, p < 0.001$), but predictably did not reveal any significant results involving gender. A mixed-effects model on all *ED* values with fixed factors voicing context, social class (higher-class, lower-class) and age group (older, younger) also revealed a strong effect of voicing context ($F[1, 35.4] = 31.6, p < 0.001$); the three-way interaction between all fixed effects was not significant ($F[1, 234.1] = 3.4, p =$

0.068).

GOAT Figure 4.8 shows the *ED* values in pre-voiced and pre-voiceless GOAT recorded for speakers in the conversational dataset, further grouped by gender, social class and age. As with FACE above, the box plots in the left panel are based on productions by lower-class speakers only, and gender does not show to have a perceptible impact on gliding movement. When comparing pre-voiceless productions of GOAT by older and by younger speakers, it seems that the extent of gliding movement is relatively increased in the latter speaker group for both lower and higher social classes. In pre-voiced contexts, it would appear that gliding movement varies with social class for older speakers. However, while it may be noted that older speakers do not display the usual pattern of longer gliding movement in pre-voiceless than in pre-voiced contexts, the extreme difference between lower- and higher-class speakers (and between pre-voiced and pre-voiceless productions by older higher-class speakers) should not be overemphasised. Pre-voiced productions of GOAT by higher-class speakers were extremely rare in the conversational data, yielding a total of only 11 tokens. The scarcity of tokens combined with the unexpected scenario of more spectral movement in pre-voiced than pre-voiceless contexts for older higher-class speakers, a finding entirely incongruous with all previous results, suggests that this phenomenon is unlikely to generalise to larger speaker samples.

A mixed-effects model on *ED* values produced by lower-class speakers with fixed factors voicing context and gender revealed a significant effect of voicing context ($F[1, 23.3] = 7.9, p < 0.01$) but no significant contributions of gender. Based on all *ED* values in the conversational dataset, a model with fixed factors voicing context, social class and age group revealed a significant three-way interaction between all fixed effects (see table 4.13). Post-hoc tests showed that for higher-class speakers, the gliding movement in pre-voiceless GOAT was significantly greater in the speech of younger than of older speakers ($coef = -0.16; chisq = 12.5; p < 0.01$).

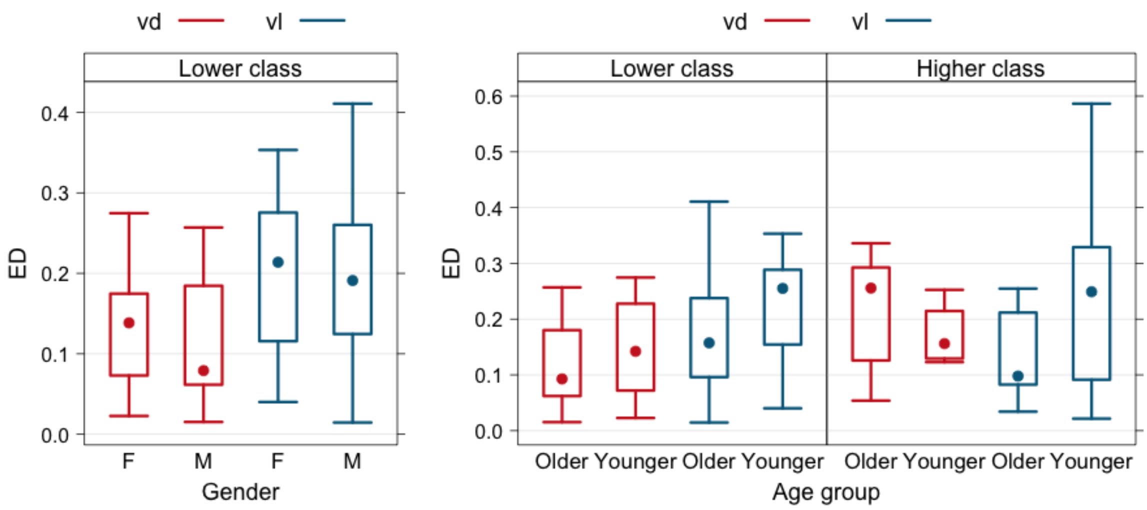

Figure 4.8: *ED* for GOAT in pre-voiced and pre-voiceless contexts by speaker variables gender (left, lower-class speakers only) and social class and age group (right)

Table 4.13: Mixed model analysis results, conversational data: *ED* in GOAT by voicing context (pre-voiced, pre-voiceless), social class (lower-class, higher-class) and age group (older, younger)

Dependent variable **Significant factors**	**F**	**(df)**	**p-value**	
ED				
Voicing context	4.9	$(1, 108.3)$	< 0.05	*
Age group	7.1	$(1, 10.8)$	< 0.05	*
Voicing context : Social class : Age group	4.0	$(1, 90.3)$	< 0.05	*

4.1.5.5 Social variation: Map task and citation form data

FACE Figure 4.9 displays the *ED* values for pre-voiced and pre-voiceless FACE produced by speakers in the map task and citation form settings, grouped by speaker gender and social class. It appears that social class has little impact on the extent of gliding movement in FACE. Female higher-class speaker may produce slightly more diphthongal tokens in pre-voiceless contexts than female lower-class speakers, but in-group variability is extensive. Of the two genders, it is the males who, on average, tend to display the highest *ED* values. This is especially noticeable in pre-voiceless tokens in the citation form data, as the relative increase in gliding movement from more informal map task to more formal citation form productions in pre-voiceless contexts is greater among male than female speakers.

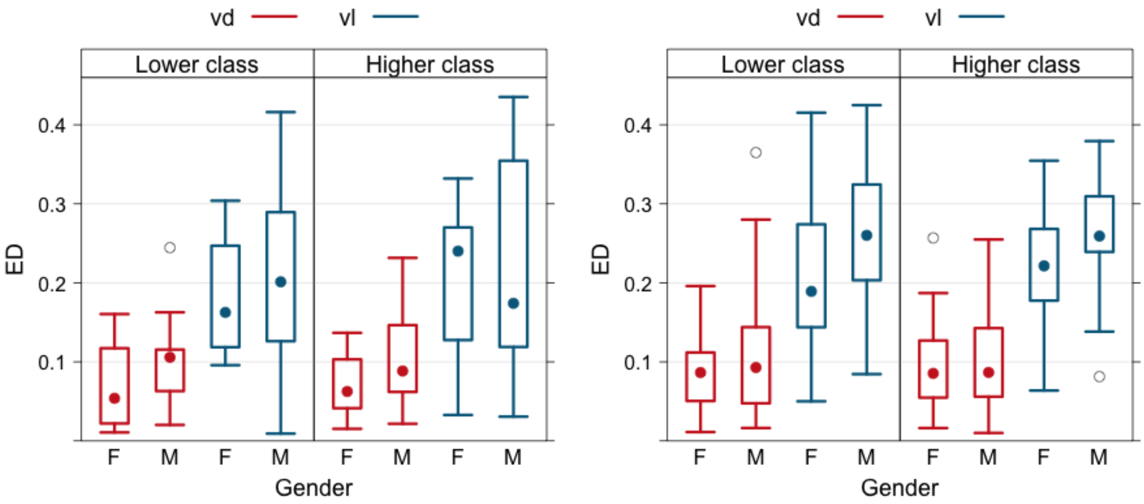

Figure 4.9: *ED* for FACE in the map task (left) and citation form (right) data by voicing context and by speaker variables gender and social class

A mixed-effects model with fixed factors voicing context, speech style, gender and social class revealed a significant three-way interaction between the factors voicing context, style and gender (see table 4.14). Post-hoc tests showed that, for male speakers, the gliding movement in pre-voiceless FACE was significantly smaller in map task than in citation form speech ($coef = -0.04; chisq = 10.0; p < 0.05$).

Table 4.14: Mixed model analysis results, map task and citation form data: *ED* in FACE by voicing context (pre-voiced, pre-voiceless), style (map task, citation form), social class (lower-class, higher-class) and gender (female, male)

Dependent variable **Significant factors**	**F**	**(df)**	**p-value**	
ED				
Voicing context	48.3	$(1, 27.7)$	< 0.001	***
Style	5.6	$(1, 25.7)$	< 0.05	*
Voicing context : Style : Gender	9.2	$(1, 488.3)$	< 0.01	**

GOAT For *ED* values in GOAT (see figure 4.10), differences between genders appear to be smaller than in FACE. Male speakers still produce slightly more diphthongal tokens in pre-voiceless contexts, particularly in the map task setting, but there is extensive overlap between the two speaker groups. In contrast to the findings for FACE, gliding movement in GOAT seems to vary as a function of social class. In the map task data, higher-class speakers display greater ED values in pre-voiceless tokens than lower-class speakers, and the stylistic shift to citation form productions is more pronounced among lower-class speakers. For higher-class speakers, there appears to be a style-conditioned increase in gliding movement for pre-voiced tokens of GOAT.

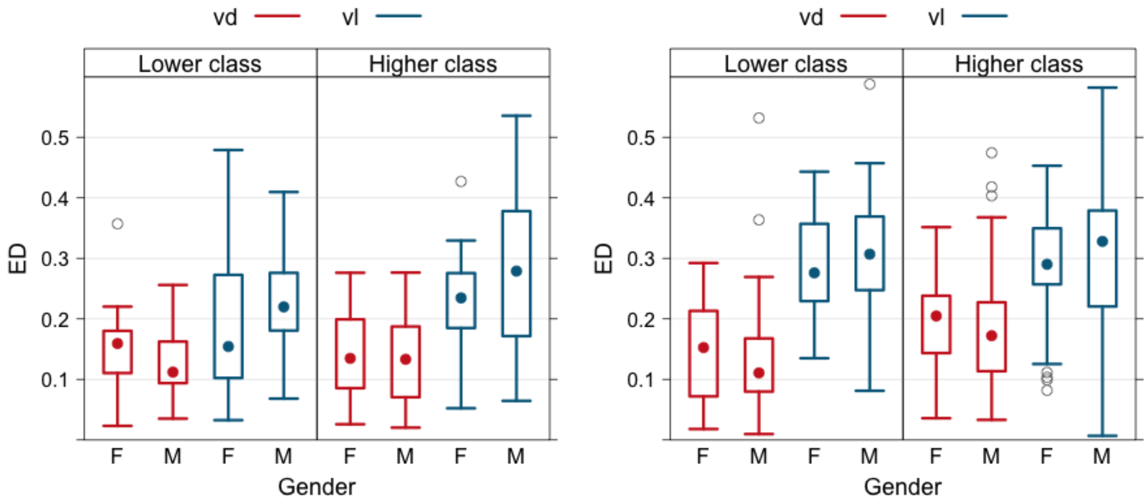

Figure 4.10: ED for GOAT in the map task (left) and citation form (right) data by voicing context and by speaker variables gender and social class

A mixed-effects model with fixed factors voicing context, style, gender and social class revealed a highly significant three-way interaction between voicing context, style and social class (see table 4.15). Post-hoc tests showed that the increase in gliding movement in citation form relative to map task productions was significant for lower-class speakers in pre-voiceless contexts ($coef = -0.08; chisq = 19.4; p < 0.001$) and for higher-class speakers in pre-voiced contexts ($coef = -0.05; chisq = 8.4; p < 0.05$). In citation form speech, the difference in ED values in pre-voiced contexts between lower- and higher-class speakers was significant ($coef = -0.06; chisq = 10.7; p < 0.01$). These relationships, presented visually in the effects plot based on the final model in figure 4.11, lead to approximation of the two voicing contexts in lower-class map task tokens and in higher-class citation form tokens; in the latter, the difference between pre-voiced and pre-voiceless tokens remains significant ($coef = -0.10; chisq = 11.6; p < 0.01$), while this is not the case for the former.

Table 4.15: Mixed model analysis results, map task and citation form data: *ED* in GOAT by voicing context (pre-voiced, pre-voiceless), style (map task, citation form), social class (lower-class, higher-class) and gender (female, male)

Dependent variable **Significant factors**	**F**	**(df)**	**p-value**	
ED				
Voicing context	21.5	$(1, 14.7)$	< 0.001	***
Style	13.5	$(1, 34.4)$	< 0.001	***
Voicing context : Style : Social class	15.5	$(1, 475.2)$	< 0.001	***

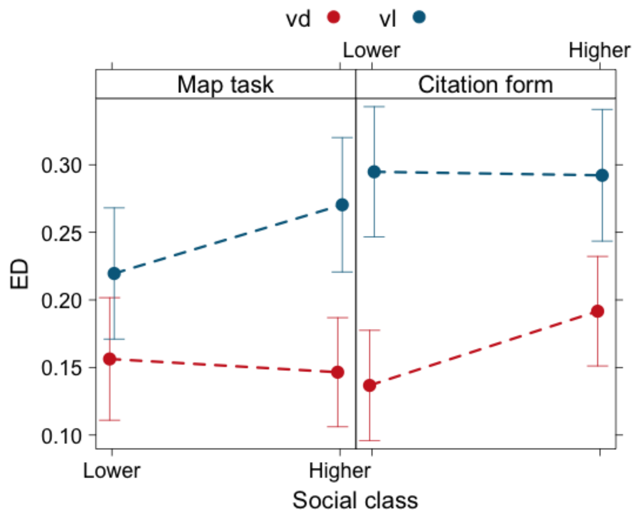

Figure 4.11: *ED* effects plot for GOAT by voicing context, task and social class

4.1.6 Summary

The previous sections have detailed the results of a close analysis of FACE and GOAT in BahC, variably produced as more or less diphthongal vowels depending on (phonetic) contextual, stylistic and social variables. As expected, both FACE and GOAT revealed strong voicing-conditioned variation with the effect of greater differentiation between nuclei and glides in pre-voiceless contexts. While this was caused primarily by peripheralisation of pre-voiceless glides, the shift in glides in the map task and citation form data was accompanied by a reverse, centralising shift in pre-voiceless nuclei. This finding directly contradicts predictions by Moreton (2004, cf. section 4.1.2.2), who claimed that pre-voiceless nuclei either remain in the same position as pre-voiced nuclei or shift in the direction of pre-voiceless glides. One might attempt to explain this phenomenon in terms of pre-voiceless hyperarticulation, arguing that the diphthongs in FACE and GOAT are so short that hyperarticulation spreading from the following consonant not only affects the end portion of the vowel but the vowel in its entirety. While it is unclear how far back pre-voiceless hyperarticulation can actually reach, this scenario, which is based on the assumption that FACE and GOAT are phonological diphthongs in BahC, seems highly unlikely, as centralisation of pre-voiceless relative to pre-voiced nuclei was most pronounced in the comparatively long citation form tokens. Also, if FACE and GOAT were indeed phonological diphthongs, there should be at least some indication of spectral movement in pre-voiced contexts, which, however, consistently displayed monophthongal tendencies. Alternatively, it may be posited that pre-voiced and pre-voiceless contexts induce distinct phonological shapes for FACE and GOAT.

Across speech styles, variation in pre-voiced contexts was minimal, as tokens of both FACE and GOAT were consistently produced as monophthongs. Stylistic variation was, thus, exhibited mainly by pre-voiceless tokens, where the relative peripheralisation of glides as well as the centralisation of nuclei generally, if not always significantly, increased with the formality of the speech style. The patterns of stylistic variation in FACE and GOAT resembled each other on the surface, but a closer examination revealed differences regarding the overall degree of variation as well as the influence of covarying contextual factors. More extensive spectral movement in pre-voiceless tokens in more formal speech styles was recorded for both FACE and GOAT, but style-conditioned differences were more pronounced in the latter. In addition, while increased gliding movement could be attributed primarily to durational differences correlating with speech style for FACE, this was not the case for GOAT, where duration showed to have a varied effect on the vowel depending on speech style: spectral movement in GOAT was small in the conversational data and more extensive in the citation form data, irrespective of vowel duration; in the map task data, spectral movement varied as a function of vowel duration.

Social variation within speech styles for the vowel in FACE was generally very small. In the conversational data, there was a tendency for older lower-class speakers to produce more monophthongal tokens in pre-voiceless contexts than their older higher-class counterparts, but the difference was not significant. In the map task and citation form data, male speakers displayed a greater stylistic shift than female speakers, in that spectral movement in pre-voiceless FACE increased significantly from map task to citation form production.

For the vowel in GOAT, a moderate amount of social variation was found within speech styles. In the conversational data, pre-voiceless GOAT was more diphthongal in the speech of younger than older higher-class participants. The same tendency could also be observed for younger and older lower-class speakers, but, here, the effect was not significant. In the map task data, the difference between pre-voiced and pre-voiceless GOAT was not significant for the lower-class speakers, who generally produced little spectral movement in GOAT in this speech style. These speakers also showed a significant increase in gliding movement from map task to citation form style, restricted to pre-voiceless contexts. Conversely, higher-class speakers showed a significant style-conditioned increase in gliding movement in pre-voiced contexts, while gliding movement in pre-voiceless contexts remained extensive throughout.

4.2 MOUTH and PRICE

Wells (1982, 149-152) defines the standard lexical sets MOUTH and PRICE as comprising words such as *house, loud, now* and *night, side, pie*, whose citation forms in RP and GenAm have the stressed vowels /aʊ/ and /aɪ/, respectively. In most instances, /aʊ/ and /aɪ/ derive from Middle English /uː/ and /iː/, which developed onglides in the course of a large-scale set of vowel quality changes around the fifteenth century known as the Great Vowel Shift (GVS). While the exact path of development remains a topic of academic debate (e.g. Yamada, 1984), the starting points of the diphthongised forms gradually became more open and central. Many conservative English dialects today rest at the final stage of this process, displaying a symmetrical pair of upgliding diphthongs with identical nuclei in unrounded low-central position close to [a] (Labov, 1994, 167-169). However, MOUTH and PRICE are particularly prone to regional, social and contextual variation involving the position of either or both nucleus and glide. Backed (and raised) nuclei in PRICE, for instance, are characteristic of the urban south of England and of southern hemisphere varieties, and fronted (and raised) nuclei in MOUTH can be found in many southern British as well as Southern US accents. According to Labov (1994, 167), fronting of MOUTH along with backing of PRICE can be interpreted as an extension of the GVS, as nucleus-glide differentiation is at least initially further increased. The diphthongs in MOUTH and PRICE also exhibit a good deal of allophonic variation in English, which will be discussed in more detail in section 4.2.2 below, after proposed realisations of MOUTH and PRICE in Bahamian varieties are outlined in section 4.2.1.

4.2.1 MOUTH and PRICE in Bahamian varieties

In the Bahamian Creole literature, the vowels in words like PRICE and MOUTH are generally described as conservative, fairly standard, high-front or high-back gliding diphthongs, respectively. Table 4.16 lists the vowel qualities of BahC as proposed by Wells (1982), Holm and Shilling (1982) (HS), and Childs and Wolfram (2004)(CW), comparing them to variants in a selection of associated varieties (Edwards, 2004; Blake, 2004; Devonish and Harry, 2004; Weldon, 2004; Youssef and James, 2004; Thomas, 2001; Labov et al., 2006).

Table 4.16: Suggested vowel qualities in BahC and associated varieties.

	Bahamian Creole			Caribbean varieties			US varieties	
Lexical set	Wells	HS	CW	Bajan	TrinC	JamC	Gullah	AAVE
MOUTH	ɑʊ	aʊ	aɔ ~ ɑɔ	ʌu ~ ʌʊ	o ~ ɔʊ	ɵʊ ~ aʊ	ɔʊ ~ ɐʊ	aɔ
PRICE	ʌɪ	aɪ	ai ~ ɑi	ʌɪ	aɪ	ai	ɐɪ	aɪ
PRIZE	ʌɪ	aɪ	aː	ʌɪ	aɪ	ai	ɐɪ	aæ ~ aː

While authors essentially agree on the interpretation of the two vowels as constituting two functional phonemes in at least some forms of BahC, they differ with respect to reported social and/or contextual variants. CW note monophthongal productions for PRIZE, i.e. PRICE in pre-voiced contexts, exhibiting a pattern similar to that found in modern AAVE. They report the results of an acoustic analysis of three black Bahamian speakers from Abaco Island, who produced fully glided tokens [ai] for PRICE preceding voiceless consonants but drastically reduced glides [aː ~ aæ] preceding voiced consonants (Childs et al., 2003, 21-23). While these findings suggest that black Bahamian speech is closer to North American than to Caribbean varieties regarding realisations of PRICE, it is important to be aware of the study's limitations for generalisability, Abaco being a small place outside the mainstream. Holm (1983, 310) points out that monophthongal productions of PRICE before voiced consonants do indeed occur in some Bahamian varieties, but they are confined to certain islands settled principally from the American South and otherwise as rare in the Bahamas as in the rest of the Caribbean (see e.g. Bailey and Thomas, 1998, 97-100). According to Shilling (1980), monophthongal PRICE [a] is not a contextual but a social variant. It is a feature of basilectal BahC, where PRICE "falls together" (141) with equally monophthongal MOUTH [a].

For non-creolised Bahamian varieties, it has also been suggested that the allophones of MOUTH and PRICE follow the rules of "Canadian Raising" (Trudgill, 1986, 160), whereby the nucleus is raised to mid height before voiceless consonants (Chambers, 1973). While evidence of pre-voiceless raising can be found in many North American varieties from Canada to coastal South Carolina and Georgia, where it variably affects the nuclei of either or both MOUTH and PRICE, it has not been observed in any of the Atlantic creole languages. In a number of Caribbean varieties and in Gullah the nuclei in MOUTH may be raised to [ʌ ~ ɔ] irrespective of the phonetic context (see table 4.16 and e.g. Wassink, 2001; Thomas and Bailey, 1998), but so far no evidence of nuclear raising has been attested for the Bahamian context, voicing-conditioned or otherwise. Indeed, CW explicitly oppose the notion, stating that "[s]ome observers have mistakenly associated the diphthong of MOUTH in The Bahamas with Canadian raising" (441). They argue that this type of raising is found in neither black nor white Bahamian speech and may have been confused with front-glided [aɛ] in white Bahamian varieties. The following section will give a brief overview of the allophony patterns mentioned in the available descriptions of BahC vowels.

4.2.2 Voicing-conditioned alternation in MOUTH and PRICE

The diphthongs in MOUTH and PRICE exhibit a good deal of allophonic variation in English, generally with a clear split between two distinct positional variants. In some accents, a 'raised' variant is produced before voiceless obstruents, occasionally accompanied by fronting in PRICE and backing in MOUTH, while the 'neutral', unraised variant occurs in certain other environments. The best known example of such an allophonic alternation is referred to as 'Canadian Raising', even though its application is not restricted to Canadian varieties of English. In a number of other accents, PRICE is reported to undergo glide weakening before voiced consonants and word-finally, resulting in some cases in monophthongal productions, while fully glided variants are produced in all other contexts. Occasionally termed 'Southern monophthongisation', this alternation is a well-known feature of both Southern US white speech and AAVE.

4.2.2.1 Pre-voiceless raising

The term 'Canadian Raising', coined by Chambers in 1973, refers to an allophonic distribution conditioned by coda voicing whereby the nuclei in the diphthongs /aɪ/ and /aʊ/ are higher when followed by a tautosyllabic voiceless consonant than in other environments: approximately *ice* [ʌɪs] and *house* [hʌʊs] versus *eyes* [aɪz], *eye* [aɪ] and *loud* [laʊd], *how* [haʊ] (Chambers, 1973; Paradis, 1980). Canadian Raising has long been considered a stereotypical feature of Canadian English, dating back to at least the 1880s (Thomas, 1991, 148), with first accounts in linguistic journals being published in the mid to late 1930s (Ayearst, 1939; Emeneau, 1935). Since it was brought to wider linguistic attention as a phonological problem by Joos (1942), who discussed the possible development of a phonemic split of the diphthongs before flapped /t/, Canadian Raising has been studied extensively, being reported from various parts of Canada (e.g. Gregg, 1957; Chambers, 1973; Thomas, 1991), from US territories ranging from Michigan to coastal South Carolina and Georgia (e.g. Dailey-O'Cain, 1997; Kurath and McDavid, 1961; Labov, 2001; Moreton and Thomas, 2007; Shewmake, 1945; Thomas, 1991, 2004; Vance, 1987), from islands in the South Atlantic Ocean such as St. Helena, Tristan da Cunha and the Falkland Islands (Trudgill, 1986, 160) and from the British Fens (Britain, 1997). The process is regular and productive, affecting either one or both MOUTH and PRICE. Given the wide geographical spread of the phenomenon and the improbability of its diffusion by contact with Canadian English in all of the above mentioned territories, 'Canadian Raising' seems somewhat of a misnomer and will henceforth be referred to as 'pre-voiceless raising'.

Much controversy has surrounded the origin of pre-voiceless raising since, for which various mechanisms have been proposed. According to one hypothesis, pre-voiceless raising is an "archaism" (Lass, 1987, 285), an intrinsically conservative phenomenon remnant of the GVS. It has been suggested that, as the nuclei of the diphthongised forms gradually lowered, successive stages of the phono-lexical vowel shift systematically reached pre-voiceless contexts late (Ogura et al., 1991; Ogura, 1995). While in many dialects voiceless-coda diphthongs eventually caught up with the shift in the favoured environments, persistent pre-voiceless raising is argued to represent an arrested development as not-fully-lowered diphthongs became fossilised (Gregg, 1973; Lass, 1987; Picard, 1977). This theory has been termed the "Failure-to-Lower hypothesis" by Britain (1997, 32). It receives some support from similar developments in Scottish and Scottish-Irish dialects, where realisations of PRICE reflect the allophonic split between long and short vowels according to the Scottish Vowel Length Rule: [aɪ] occurs before voiced fricatives, before /r/ and in morpheme-final position while [ʌɪ] is used in all other environments (Gregg, 1973; Milroy, 1996). Indeed, Gregg (1973, 142) claimed that, in view of the number of Scottish and Irish immigrants who left for the New World, it is likely that pre-voiceless raising in North America is simply an extension of the Scottish Vowel Length Rule in that the following context for fully glided diphthongs widened to include all voiced consonants, not only fricatives. Other authors, however, pointed out that if the Canadian-Raising-type allophony of pre-voiceless raising could emerge independently in a number of otherwise unrelated accents in North America, either as the direct results of the

GVS progression or mediated via processes connected to the Scottish Vowel Length Rule, it is suspiciously rare in the British Isles (Chambers, 1989; Trudgill, 1986, 156). Moreover, at least some cases of pre-voiceless raising in parts of the US bordering Canada appear to be the result of very recent developments, an innovation possibly, but not necessarily, spreading from Canada (Thomas, 2000; Moreton and Thomas, 2007).

An alternative hypothesis was provided by Chambers (1973, 1989), sometimes referred to as the "Raising hypothesis" (Britain, 1997, 33). Far from being an intrinsically archaic form, pre-voiceless raising is considered a 20th century innovation, resulting directly from the shortening of vowels in pre-voiceless environments. It is argued that the relative shortness exerts particular pressure on diphthongs with low nuclei and high glides, a situation that can logically be resolved in two ways: either by raising the nucleus or by lowering the glide. In both cases, the gliding distance of the diphthongs would be reduced to accommodate the relatively shorter duration in pre-voiceless contexts. Pre-voiceless raising would, thus, be a manifestation of the first scenario and the term 'raising' in this view may be interpreted synchronically as well as diachronically. It should be noted that, in accordance with this line of argumentation, proponents of the Failure-to-lower hypothesis may also point to the "phonological naturalness" (Britain, 1997, 31) of the described scenario as an explanation of why nuclei in pre-voiceless contexts reach low targets later than those in pre-voiced contexts.

A third hypothesis, known as the "Contact, Focusing, and Reallocation hypothesis" (Britain, 1997, 34), redefines pre-voiceless raising as a dialect contact phenomenon. First advanced by Trudgill (1986, 158-161) for heartland Canadian English and by Britain and Trudgill (2005) for English in the British Fens, it is argued that the observed allophonic distribution is the result of structural reallocation in the context of koineisation. In this scenario, dialects with variants of MOUTH and PRICE at varying stages of the GVS, and possibly reflecting further developments, came into close contact. In the subsequent process of new-dialect formation, the input varieties were gradually focussed over time into a more homogenous dialect via a combination of dialect levelling and simplification. If two or more input variants of the diphthongs survived, their distribution was regularised by allocating them to phonologically distinct environments. Reference is made once more to the "natural phonetic tendencies" Trudgill (1986, 159) at work in the allocation of raised variants to the shorter diphthongs before voiceless consonants.

Both the raising and the contact hypothesis are viable scenarios that may account for the occurrence of pre-voiceless raising in many varieties of English. Indeed, they need not be mutually exclusive, accepting the fact that in sound change there are so many possible developments that, for a particular change to actually take place, multiple causation is very likely. There is, however, the question of whether the underlying phonetic explanation, that is that the relatively short duration of vowels in pre-voiceless contexts triggers the raising of the nuclei, can truly give a satisfactory account of affairs.

As stated above and noted by Chambers (1989, 84) and Britain (1997, 31) among others, the diphthongs' gliding movement in pre-voiceless contexts could also be decreased by weakening the glide. While the authors made reference to an accent in the US south midland area where forms such as this can be found (e.g. Britain, 1997, 31), it is the exact opposite that is extremely common: In AAVE and in a wide range of Southern US varieties, glide weakening occurs in the longer pre-voiced and word-final contexts, while pre-voiceless tokens remain fully glided. Trudgill (1986, 160), in discussing examples of 'Canadian Raising' in Atlantic Ocean varieties of English, remarked on the fact that, while the diphthongs in pre-voiceless environments have central onsets as in Canadian English, those in the "elsewhere" environments may be very different: "[T]hese [...] varieties have longer, backer, and more monophthongal forms." The same pattern of raised nuclei in pre-voiceless contexts along with weakened glides in pre-voiced and word-final contexts has also been observed in a number of North American mainland varieties such as accents of Eastern Virginia and northeastern North Carolina (Moreton and Thomas, 2007, 40). The existence of such allophonic patterns does not invalidate the dialect contact scenario per se. Indeed, Trudgill (1986, 160) interpreted this as lending support to the hypothesis, as dialects younger than Canadian English may reflect later south-of-England developments that formed part of their initial input. It does, however, pose doubt as to whether pre-voiceless raising can be explained phonetically as the result of optimising nucleus-glide distances according to vowel duration. Moreton and Thomas (2007) proposed an alternative phonetic basis for the phenomenon, which will be introduced in section 4.2.2.3 below.

4.2.2.2 Glide weakening

Another common type of allophony conditioned by coda voicing occurs among accents of English, whereby the diphthong in PRICE is reported to undergo glide weakening in pre-voiced and, possibly, word final contexts, alternating with fully offglided tokens in pre-voiceless environments. These accents have approximately *ice* [aɪs] versus *eyes* [aεz ~ aːz] and *eye* [aε ~ aː] (Moreton and Thomas, 2007, 39). Sometimes referred to as 'Southern monophthongisation' due to its widespread occurrence in the Southern US, the phenomenon is more geographically diverse than that. Pre-voiced glide weakening is found in a broad range of rural southern white accents, where it developed in the late 19th century and, more recently, spread to include pre-voiceless contexts in some socially restricted varieties. Due to its long association with working-class speech, upper-middle class speakers tend to avoid it. It is apparently declining along the margins of the South, though avoidance patterns are more prevalent in urban than in rural areas (Thomas, 2004, 311-312). Pre-voiced glide weakening is also a diagnostic feature of southern as well as northern varieties of AAVE. As Bailey and Thomas (1998) demonstrated, the vowel systems of speakers of early forms of AAVE shared a number of features with creole speakers, possibly reflecting a shared linguistic heritage. Productions of pre-voiced PRICE by speakers of AAVE born in the mid 19th century, like those of creole speakers, did not have weakened offglides in PRIZE, which argues against substrate influence in the emergence of glide weakening and for independent development. Bailey and Thomas (1998), thus, argued that pre-voiced glide weakening is a late 19th century innovation in AAVE, which may have paralleled contemporaneous developments in white settler dialects. Outside the North American context, offglide weakening in PRIZE is more geographically restricted but it has been reported for the varieties of English spoken in the Humberside region of northern England and in the dialects of Devon and Cornwall (Moreton and Thomas, 2007, 40). In general, glide weakening is discussed only with respect to allophonic variation in PRICE. There are some authors, however, who have noted an analogous process leading to reduced pre-voiced glides in the vowel in MOUTH (e.g. Holm, 2000, 148), usually coinciding with glide weakening in PRICE.

4.2.2.3 Asymmetric Assimilation

Moreton and Thomas (2007) proposed that pre-voiceless nuclear raising and pre-voiced glide weakening are actually two sides of the same coin, arising from universal phonetic processes which protect the glide against undershoot in pre-voiceless contexts. First, voiceless codas cause peripheralisation of glides in closing diphthongs, which can be accessed by speakers as a perceptual cue for lexical distinction (see section 4.1.2.2). This has been confirmed for speakers who do not exhibit phonologised 'Canadian Raising' (Thomas, 2000) as well as for closing diphthongs other than PRICE and MOUTH (Moreton, 2004). While the reason for this effect is unknown, Moreton and Thomas (2007, 41) speculated that it may be caused by a propensity for hyperarticulation before voiceless codas in general, which could also account for the well-documented lowering of low monophthongs in pre-voiceless contexts (also see Moreton, 2004, 24-30). Second, pre-voiceless shortening in diphthongs appears to affect primarily the beginning of the transition, which leads to shorter nucleus durations and possibly loss of nuclear steady states (Thomas, 2000, 10). A shortened nucleus is, consequently, more exposed to coarticulatory pressures from neighbouring sounds. These processes create the condition for *Asymmetric Assimilation*, whereby pre-voiceless contexts promote the assimilation of the nucleus to the glide, while the glide is dominated by the nucleus in pre-voiced contexts. It is important to note that peripheralisation of the glide cannot be considered a consequence of shortening per se, as comparable amounts of shortening caused by factors other than following voiceless consonants do not produce the same effect. When English closing diphthongs are shortened before voiceless codas, their glides become more peripheral. When they are shortened due to a change in speech rate, however, glides (may) become more central (see e.g. Gay, 1968).

Moreton and Thomas (2007) suggested that in the initial stages, pre-voiceless raising and glide weakening are just a matter of subtle phonetic differences between glides in pre-voiced and pre-voiceless context. As assimilatory pressures continue to persist, the spectral difference may become phonologised and the allophones may change even further. In the case of glide weakening, the difference between nucleus and glide continues to wane in pre-voiced contexts as the glide becomes more centralised. If, however, pre-voiceless raising spreads to the nucleus, a new case of 'Canadian Raising' emerges.

4.2.3 Research questions and hypotheses

Moreton and Thomas' (2007) notion of Asymmetric Assimilation, though essentially a diachronically-based model, can be extrapolated to formulate hypotheses that apply to socially conditioned synchronic variation within the Bahamian community, where prestigious standard productions are associated with (nearly) identical wide diphthongs in pre-voiced and pre-voiceless contexts.

1. Voicing-conditioned spectral differences will be found in the productions of all speakers, at least in glide position.

2. If pre-voiceless raising accounts for the realisations of MOUTH and/or PRICE by some BahC speakers, voicing-conditioned spectral differences will have spread to include vowel nuclei.

3. If pre-voiceless raising or pre-voiced glide weakening is socially diagnostic in the Bahamian context, non-standard productions, associated with the speech of lower social classes, will be affected more than productions by speakers of higher social classes closer to the standard.

4. A certain amount of stylistic variation is expected regardless of other, possibly phonologised, phonetic processes at work, in that wide diphthongs tend to be truncated as speech rate increases.

5. Stylistic variation will reflect the social distribution of the variants, if speakers are aware of different sociolinguistic choices available to them. Perceived stigmatisation of a particular variant will result in relatively sharp stylistic stratification, with increased use of standard-near forms correlating with an increase in formality.

4.2.4 Analysis procedure

Only vowels in maximally bisyllabic words were selected for the analysis. All vowel tokens were restricted to (C)VC contexts, except for MOUTH in the conversational dataset, where, due to the overall scarcity of tokens, word-final contexts were included and treated as pre-voiced, if these words were directly followed by a voiced consonant in connected speech. Pre-nasal and pre-liquid contexts were avoided as well as tokens following /r/ or semivowels. The data collected in the map task and citation form setting consist exclusively of vowels followed by alveolar obstruents. Tokens followed by /t/ in a potential flapping context were excluded, regardless of whether the consonant was actually flapped or not. In addition, vowels shorter then 75 ms were removed from the data. This procedure yielded a total of 1935 vowel tokens, 861 for MOUTH and 1074 for PRICE. Table 4.17 lists the total number of tokens for each lexical set, voicing context and speech style subjected to further analysis.

Table 4.17: Number of tokens for acoustic analyses by lexical set, voicing context and speech style

Lexical set	**Voicing context**	**Convers.**	**Map task**	**Cit. form**
MOUTH	Pre-voiced	50	160	252
	Pre-voiceless	96	145	158
PRICE	Pre-voiced	105	137	235
	Pre-voiceless	158	204	235
Total		409	646	880

In order to quantify the relative position of the diphthongs in the speakers' vowel spaces in the F1 and F2 dimensions jointly, log ratios of Euclidean distances were calculated which represent the relative distance to the means of TRAP and GOOSE for MOUTH and to the means of TRAP and FLEECE for PRICE. For each time point between 10% and 90% at 10%-intervals into a given vowel token, two Euclidean distances were computed, based on the raw Hertz values of F1 and F2: $ed1$, the distance to the mean of TRAP, and $ed2$, the distance to the mean of GOOSE for MOUTH or, in the case of PRICE, the distance to the mean of FLEECE. This procedure is illustrated in schematic form in figure 4.12 for the diphthong in MOUTH. The ratio of these two distances, $ed1/ed2$, indicates how close the vowel token at this particular point in time is to TRAP in relation to GOOSE or FLEECE. The logarithm of this ratio, $Lrat = log(ed1/ed2)$, gives the same information in a more convenient form: If a measurement point is closer to TRAP, the log ratio is negative; if it is closer to GOOSE or FLEECE, the log ratio is positive. A log ratio of zero would indicate that the vowel token at this time point is exactly equidistant between TRAP and GOOSE or FLEECE.

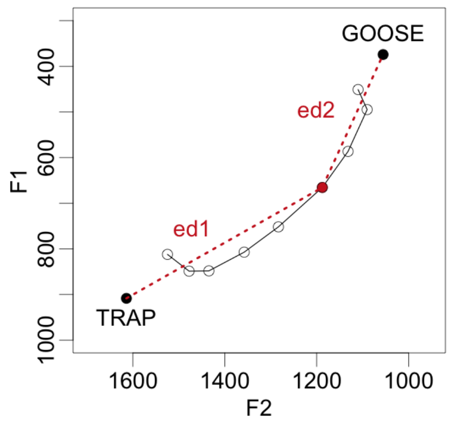

Figure 4.12: Euclidean distances between the time point at 60% of a token of MOUTH to the means of TRAP (*ed*1) and GOOSE (*ed*2)

4.2.5 Results

4.2.5.1 Visual inspection

First, we may inspect the position of the diphthongs in MOUTH and PRICE through time in the vowel space for speakers individually in order to observe the overall variability found in the data. Figure 4.13 on page 148 shows the smoothed F1' and F2' formant trajectories between 10% and 90% into the vowel for eight selected speakers and three speech styles, with pre-voiced (red) and pre-voiceless (blue) contexts treated separately. Pre-voiceless tokens appear to be raised and, to a lesser extent, peripheralised compared to pre-voiced tokens for both MOUTH and PRICE. While this general pattern holds for all speakers and styles, there is a great deal of variability concerning the degree of spectral differentiation both within and across speech styles. For speakers such as Johnny in the conversational and Art01 in the map task setting, the difference between pre-voiced and pre-voiceless tokens in MOUTH is particularly extreme. In pre-voiced contexts, they produce low nuclei near TRAP at approximately [a], while the nuclei in pre-voiceless tokens may be raised to approximately [ɔ]. Some speakers such as Sharon also produce mid-high nuclei in pre-voiced contexts, resembling the typical realisation of the diphthong in many Atlantic creoles (see table 4.16 on page 138), but these speakers tend to show a great deal of intra-speaker variation and pre-voiced raised variants cooccur with unraised variants.

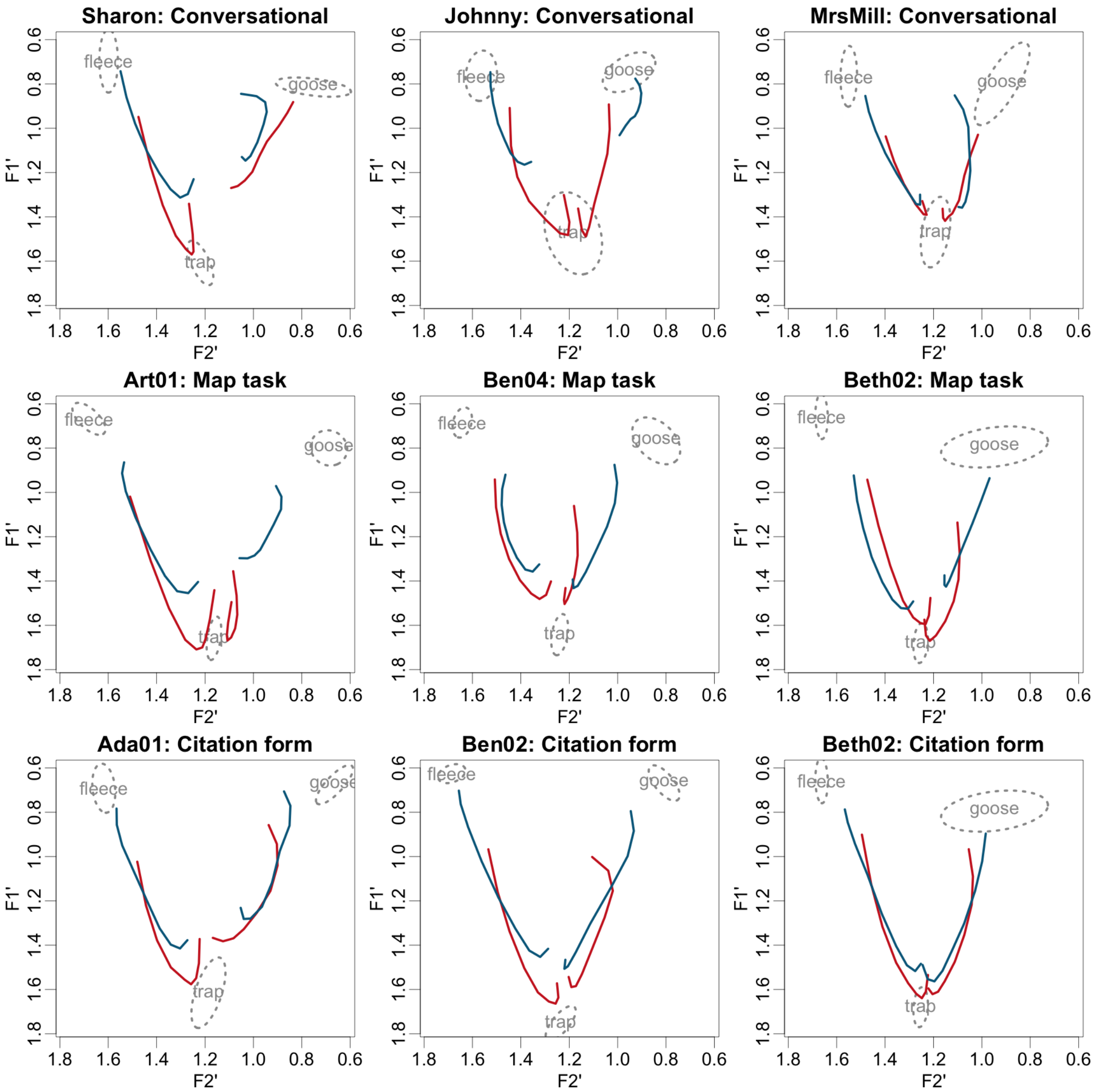

Figure 4.13: Smoothed trajectories of MOUTH and PRICE in pre-voiced (red) and pre-voiceless (blue) contexts for eight speakers and three speech styles (normalised F1, F2)

Across speech styles, the difference seems to lie primarily in an overall extended gliding movement of the diphthongs in the citation form setting. As illustrated by speaker Beth02, the increase in gliding movement may coincide with a decrease of differentiation between pre-voiced and pre-voiceless variants, especially for MOUTH.

4.2.5.2 Variation across tasks

MOUTH The spectral difference between pre-voiced and pre-voiceless tokens of MOUTH (see figure 4.14) shows considerable stylistic variation in that it is most pronounced in the conversational data and successively smaller in the more formal speech styles. For pre-voiceless tokens, stylistic variation appears to affect primarily the first part of the diphthong, which is raised in more informal speech (conversational>map task>citation form). In pre-voiced tokens, it is the glide that is more variable, being lower in the map task data compared to the conversational or the citation form data. The overall extent of gliding movement seems to increase in more formal speech. While this is obvious when comparing map task and citation form productions, conversational variants present a more complicated picture: Pre-voiceless MOUTH in the conversational data is indeed less diphthongal than in the map task data, but the reverse is true for pre-voiced tokens. These observations, however, should be interpreted only with caution as a direct comparison of the conversational with the other datasets may be problematic. Log ratios for the map task and citation form data are based on Euclidean distances to the means of TRAP and GOOSE (or, in the case of PRICE, FLEECE) in the citation form setting; log ratios for the conversational data are based on distances to the means of TRAP and GOOSE/FLEECE in the conversational setting. As vowels tend to be less peripheral in casual speech, the extent of gliding movement of the diphthongs, which is quantified only in relation to TRAP and GOOSE/FLEECE, may, thus, be confounded by a decrease in distance between TRAP and GOOSE/FLEECE themselves.

Table 4.18: Log ratio means and standard deviations for MOUTH at two time points by voicing context and style; values derived from all observed tokens

Time point	Voicing context	Conversational	Map task	Citation form
Nucleus	Pre-voiced	-1.64 (0.84)	-1.41 (0.85)	-1.68 (0.76)
	Pre-voiceless	-0.09 (0.99)	-0.56 (0.75)	-1.23 (0.77)
Glide	Pre-voiced	0.10 (1.04)	-0.27 (0.68)	0.53 (0.70)
	Pre-voiceless	1.01 (0.78)	1.17 (0.88)	1.33 (0.74)

For statistical testing, the information in the data was reduced to log ratios at two time points per vowel token: the nucleus, defined as the point of maximum F1 between 20% and 40% into the vowel, representing the point of maximal vocalic

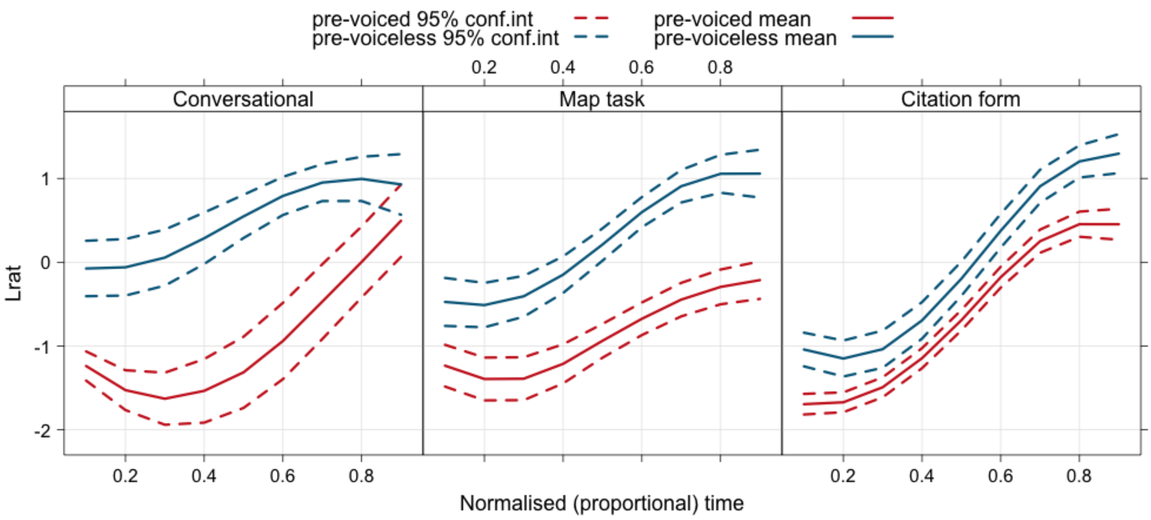

Figure 4.14: Log ratios across time for MOUTH by voicing context and task; means and confidence intervals derived from smoothed speaker values

openness, and the glide, fixed at 80%. The means and standard deviations of the log ratios of MOUTH at these two time points can be found in table 4.18. The values listed are based on all observed tokens; unequal token numbers between speakers were not controlled for, which means that some speakers may have a slightly disproportionate influence.

A mixed-effects model analysis was conducted with log ratio values as dependent variable and fixed factors time point (nucleus, glide), voicing context (pre-voiced, pre-voiceless) and speech style (conversational, map task, citation form). The analysis showed a significant interaction between all main effects (see table 4.19) and post-hoc tests were carried out. An analysis of simple main effects revealed a significant difference between pre-voiced and pre-voiceless glides in both map task ($coef = -1.04; chisq = 44.2; p < 0.001$) and citation form data ($coef = -0.61; chisq = 17.2; p < 0.001$). In addition, there was a significant contrast between conversational and citation form speech in pre-voiceless nuclei ($coef = 0.90; chisq = 23.1; p < 0.001$) and pre-voiceless glides ($coef = -0.50; chisq = 9.0; p < 0.05$); in both cases, log ratios in conversational speech were higher than in citation form speech. In the map task, pre-voiceless nuclei were higher/more peripheral ($coef = 0.5; chisq = 27.5; p < 0.001$) and pre-voiced glides were lower/less peripheral ($coef = -0.65; chisq = 82.2; p < 0.001$) than in citation form. A contrast-between-contrast analysis for the levels of voicing context and speech style showed that, in the nucleus, the contrast between pre-voiced and pre-voiceless contexts was significantly larger in conversational than in map task ($coef = -0.58; chisq = 6.4; p < 0.05$) or citation form ($coef = -0.88; chisq = 15.1; p < 0.001$) speech, and larger in map task than in citation form speech ($coef = -0.30; chisq = 7.0; p < 0.001$). In the glide, the contrast between pre-voiced and pre-voiceless contexts was significantly larger in map task than in conversational ($coef = 0.58; chisq = 7.7; p < 0.05$) or citation form ($coef = -0.43; chisq = 14.8; p < 0.001$) speech.

Table 4.19: Mixed model analysis results: *Lrat* in MOUTH by time point (nucleus, glide), voicing context (pre-voiced, pre-voiceless) and speech style (conversational, map task, citation form)

Dependent variable **Significant factors**	**F**	**(df)**	**p-value**	
Lrat				
Time point	127.3	$(1, 31.7)$	< 0.001	***
Voicing context	7.5	$(1, 113.9)$	< 0.01	**
Time point : Voicing context	16.9	$(1, 70.5)$	< 0.001	***
Time point : Style	52.1	$(2, 107.7)$	< 0.001	***
Voicing context : Style	11.0	$(2, 137.3)$	< 0.001	***
Time point : Voicing context : Style	10.1	$(2, 631.5)$	< 0.001	***

Even though the difference between pre-voiceless and pre-voiced nuclei in the conversational data appeared to be extensive, in terms of simple main effects, it did not show to be significant. This may be in part due to the overall scarcity of pre-voiced tokens, which for some speakers were only represented by one or two word types. It is also the case, however, that inter-speaker variability was particularly large in the conversational speech style. It is interesting to note that the time points and voicing contexts which show the most variation across tasks, that is pre-voiceless nuclei and pre-voiced glides, also show the most variation within the conversational data as reflected by the comparatively large standard deviations in table 4.18. Whether some of this variability can be accounted for by the social identity of speakers will be investigated in section 4.2.5.3.

PRICE At first glance, the spectral difference between pre-voiced and pre-voiceless tokens of PRICE does not appear to be affected by speech style to the same extent as observed for MOUTH (see figure 4.15). In all three stylistic settings, there is a solid difference between the two voicing contexts, with higher log ratios in pre-voiceless contexts throughout the vowel. When the log ratio means listed in table 4.20 are consulted, it transpires that the spectral difference conditioned by voicing is somewhat more prominent in conversational speech. In log ratio units, the difference between pre-voiced and pre-voiceless tokens in the nucleus decreases from 1.29 in the conversational data to 0.92 and 1.02 in the map task and citation form data, respectively. In the glide, the spectral difference decreases from 1.43 to 0.88 and 1.19. In contrast to MOUTH, however, stylistic variation is not mainly restricted to pre-voiced glides and pre-voiceless nuclei. The overall extended gliding movement in PRICE in citation form speech can be attributed to lower log ratios in the nucleus and higher log ratios in the glide for both voicing contexts.

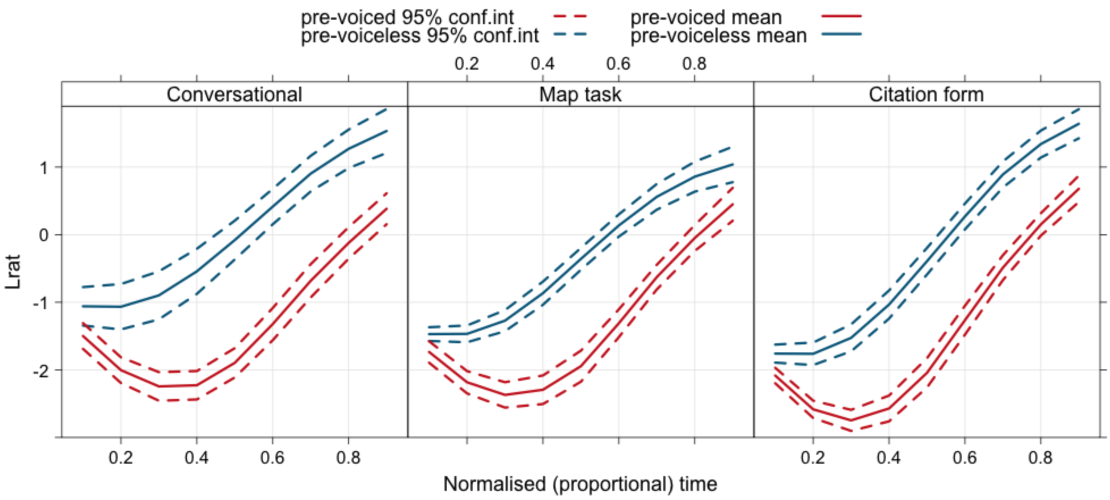

Figure 4.15: Log ratios across time for PRICE by voicing context and task; means and confidence intervals derived from smoothed speaker values

Table 4.20: Log ratio means and standard deviations for PRICE at two time points by voicing context and style; values derived from all observed tokens

Time point	Voicing context	Conversational	Map task	Citation form
Nucleus	Pre-voiced	-2.30 (0.79)	-2.40 (0.65)	-2.80 (0.70)
	Pre-voiceless	-1.01 (0.77)	-1.48 (0.66)	-1.78 (0.64)
Glide	Pre-voiced	-0.08 (0.63)	0.01 (0.59)	0.24 (0.49)
	Pre-voiceless	1.35 (0.86)	0.89 (0.86)	1.43 (0.70)

A mixed model analysis was conducted on the log ratio values of PRICE with the same specifications as above for MOUTH. The analysis showed significant interactions between style and time points and between style and voicing context (see table 4.21). A subsequent analysis of simple main effects revealed that the effect of voicing context was significant for all speech styles (conversational: $coef = -1.17; chisq = 122.5; p < 0.001$; map task: $coef = -0.83; chisq = 54.5; p < 0.001$; citation form: $coef = -0.92; chisq = 70.7; p < 0.001$). In addition, glides in citation form speech were significantly higher/more peripheral than in map task speech ($coef = -0.25; chisq = 25.2; p < 0.001$), while nuclei in citation form speech were significantly lower/more central than in map task ($coef = 0.38; chisq = 60.1; p < 0.001$) or conversational speech speech ($coef = 0.62; chisq = 23.8; p < 0.001$). An analysis of interaction contrasts showed that the contrast between voicing contexts was greater in conversational than in map task speech ($coef = -0.34; chisq = 6.9, p < 0.05$).

Table 4.21: Mixed model analysis results: *Lrat* in PRICE by time point (nucleus, glide), voicing context (pre-voiced, pre-voiceless) and speech style (conversational, map task, citation form)

Dependent variable **Significant factors**	**F**	**(df)**	**p-value**	
Lrat				
Time point	864.9	$(1, 50.8)$	< 0.001	***
Voicing context	108.4	$(1, 64.9)$	< 0.001	***
Time point : Style	50.0	$(2, 92.3)$	< 0.001	***
Voicing context : Style	3.6	$(2, 183.5)$	< 0.05	*

4.2.5.3 Variation in the conversational data

MOUTH The conversational dataset for MOUTH is characterised by extensive inter- as well as intra-speaker variability. Figure 4.16 illustrates that, based on speaker means, a pattern can be discerned whereby lower-class speakers of both genders produce higher nuclei in pre-voiceless contexts than female higher-class speakers. For both lower-class males and females, the median log ratio in pre-voiceless nuclei is equal to or greater then zero, which indicates that at least 50% of all lower-class speakers produce on average pre-voiceless nuclei in MOUTH that are spectrally closer to GOOSE than to TRAP. A similar trend can be observed for log ratios in glide position: Although the contrast between voicing contexts is smaller than in the nuclei, log ratios in pre-voiceless glides are consistently higher than in pre-voiced glides. For the lower-class speakers, median log ratios in pre-voiced glides are equal to or smaller than zero; that is 50% of the lower-class speakers produce pre-voiced glides that are closer to TRAP than to GOOSE.

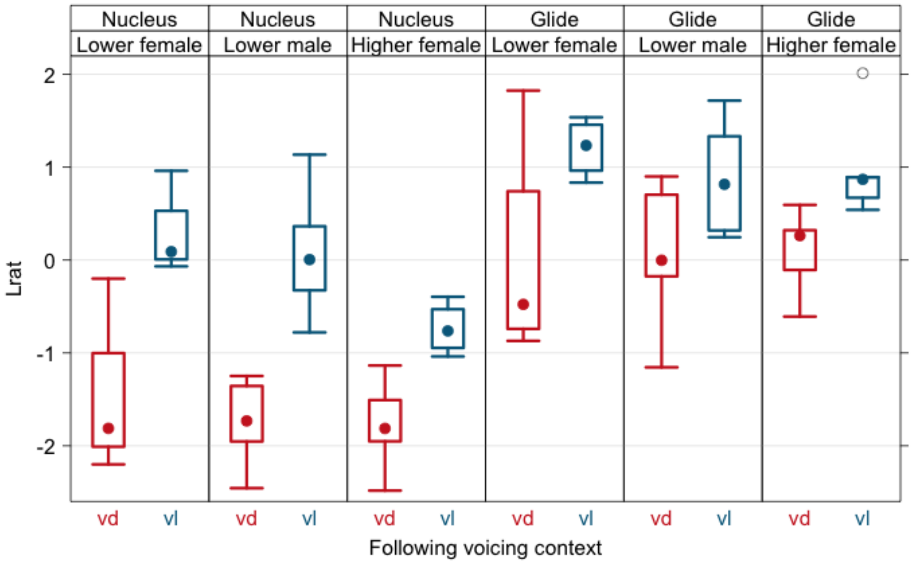

Figure 4.16: Log ratios for MOUTH in the conversational dataset by time point, social group and voicing context; based on speaker means

In order to test the statistical significance of these observations, two mixed model analyses were performed. The first model was constructed to test the effect of gender on the log ratio values of lower-class speakers only. Apart from gender (male, female), the other fixed factors included in the model were time point (nucleus, glide) and voicing context (pre-voiced, pre-voiceless). As expected, neither gender nor any interaction involving gender showed to be significant. The second model was designed to subsequently test the effect of social class on the log ratios produced by all speakers in the conversational dataset; fixed factors included time point, voicing context and social class (lower-class, higher-class). The test revealed a significant three-way interaction between all fixed factors (see table 4.22). Post-hoc tests confirmed that lower-class speakers had relatively high log ratios in pre-voiceless nuclei: They were significantly higher than log ratios in pre-voiced nuclei ($coef = -1.51; chisq = 19.1; p < 0.001$) and significantly higher than log ratios in pre-voiceless nuclei produced by higher-class speakers ($coef = 0.86; chisq = 10.8; p < 0.01$). In addition, pre-voiceless glides were significantly higher/more peripheral than pre-voiced glides for lower-class speakers

($coef = -0.80; chisq = 9.0; p < 0.05$).

Table 4.22: Mixed model analysis results; conversational data: *Lrat* in MOUTH by time point (nucleus, glide), voicing context (pre-voiced, pre-voiceless) and social class (lower-class, higher-class)

Dependent variable **Significant factors**	**F**	**(df)**	**p-value**	
Lrat				
Time point	88.2	$(1, 8.7)$	< 0.001	***
Voicing context	17.4	$(1, 21.6)$	< 0.001	***
Time point : Social class	5.7	$(1, 12.7)$	< 0.05	*
Time point : Voicing context : Social class	5.3	$(1, 225.2)$	< 0.05	*

PRICE While the realisation of PRICE within social groups, illustrated in figure 4.17, is more focussed than in the case of MOUTH, social variation across these groups is more diverse and appears to be influenced by the speakers' gender as well as social class. Log ratios for male speakers are higher than those for females in both nucleus and glide and in all voicing contexts. In terms of social class, differences occur primarily in the nucleus of pre-voiceless tokens: Lower-class speakers of both genders display higher log ratios than female higher-class speakers, even though the nuclei are not usually raised to the extent that they are closer to FLEECE than to TRAP. Overall, the difference between pre-voiced and pre-voiceless tokens remains fairly stable

As for MOUTH above, two successive mixed model analyses were conducted. The first model focussed on log ratios among lower-class speakers only, with fixed factors time points, voicing context and gender. The analysis revealed significant main effects for all fixed factors: time point ($F[1, 10.1] = 271.8; p < 0.001$), voicing context ($F[1, 26.0] = 96.9; p < 0.001$) and gender ($F[1, 7.4] = 9.5; p < 0.05$). A second model was fit to all data points in the conversational dataset with fixed factors time point, voicing context, and social group (lower-class females, lower-class males, higher-class females). The results are listed in table 4.23. While all main effects were significant, the interaction between all fixed factors did not reach significance. An analysis of simple main effects for the levels in the factor social group showed that log ratios for lower-class males were significantly higher than those for higher-class females ($coef = 0.60; chisq = 13.8; p < 0.001$).

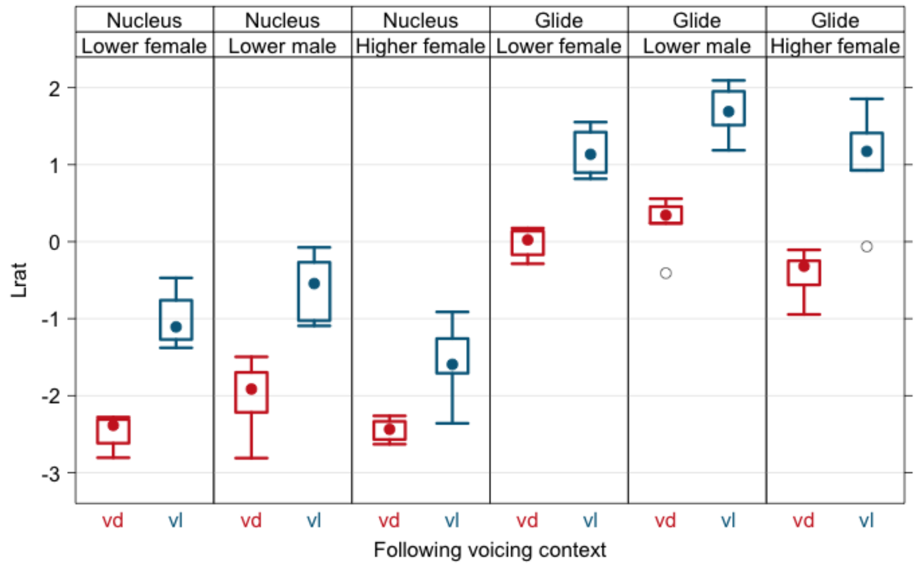

Figure 4.17: Log ratios for PRICE in the conversational dataset by time point, social group and voicing context; based on speaker means

Table 4.23: Mixed model analysis results; conversational data: *Lrat* in PRICE by time point (nucleus, glide), voicing context (pre-voiced, pre-voiceless) and social group (lower-class females, lower-class males, higher-class females)

Dependent variable **Significant factors**	**F**	**(df)**	**p-value**	
Lrat				
Time point	365.3	$(1, 16.0)$	< 0.001	***
Voicing context	124.8	$(1, 24.1)$	< 0.001	***
Social group	7.8	$(2, 11.8)$	< 0.01	**
Time point : Voicing context : Social group	2.9	$(2, 427.8)$	$= 0.057$	

4.2.5.4 Variation in the map task and citation form data

MOUTH Productions of MOUTH in the map task setting are clearly characterised by a spectral difference between pre-voiced and pre-voiceless contexts, the latter being raised in relation to the former (see figure 4.18). The differentiation of voicing contexts is particularly pronounced in glide position, where it may be more appropriate to describe the phenomenon as pre-voiced glide weakening, with the great majority of speakers producing log ratios below zero and, thus, glides that are closer to TRAP than to GOOSE. Pre-voiceless nuclei appear to be somewhat higher in lower-class than in higher-class speech, but the pattern is disrupted by two speakers in particular, Ben03 and Beth03, who produce considerably raised nuclei with mean log ratios at 0.45 and 0.50, respectively. In addition, the data indicate a possible influence of speaker gender: The positions of nuclei in pre-voiced and pre-voiceless contexts are more clearly separated among female than male speakers.

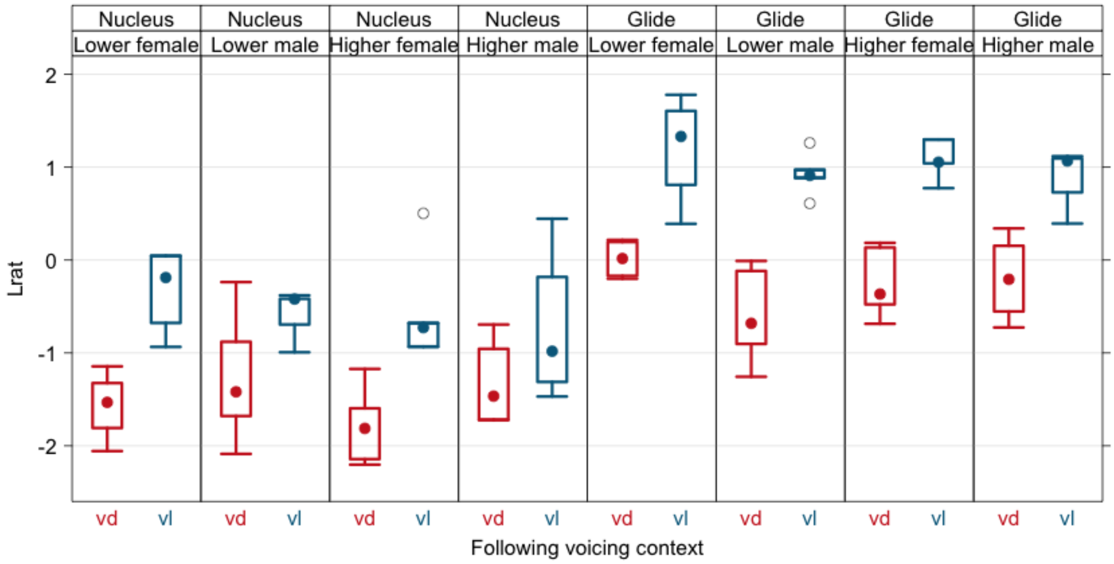

Figure 4.18: Log ratios for MOUTH in the map task dataset by time point, social group and voicing context; based on speaker means

In the citation form data (see figure 4.19), productions of MOUTH appear more focussed in that between-speaker variation has generally decreased. Pre-voiceless nuclei are lower compared to those in the map task data and the spectral difference between voicing contexts is, thus, considerably reduced. On average, lower-class speakers produced slightly higher pre-voiceless nuclei, and it is again Ben03 and Beth03 that display the highest scores, mean log ratios at -0.65 and -0.88, respectively, among the group of higher-class speakers. Pre-voiced glides were higher compared to map task productions and the majority of associated log ratios are now above zero. There remains, however, a clear difference between pre-voiced and pre-voiceless contexts in glide position.

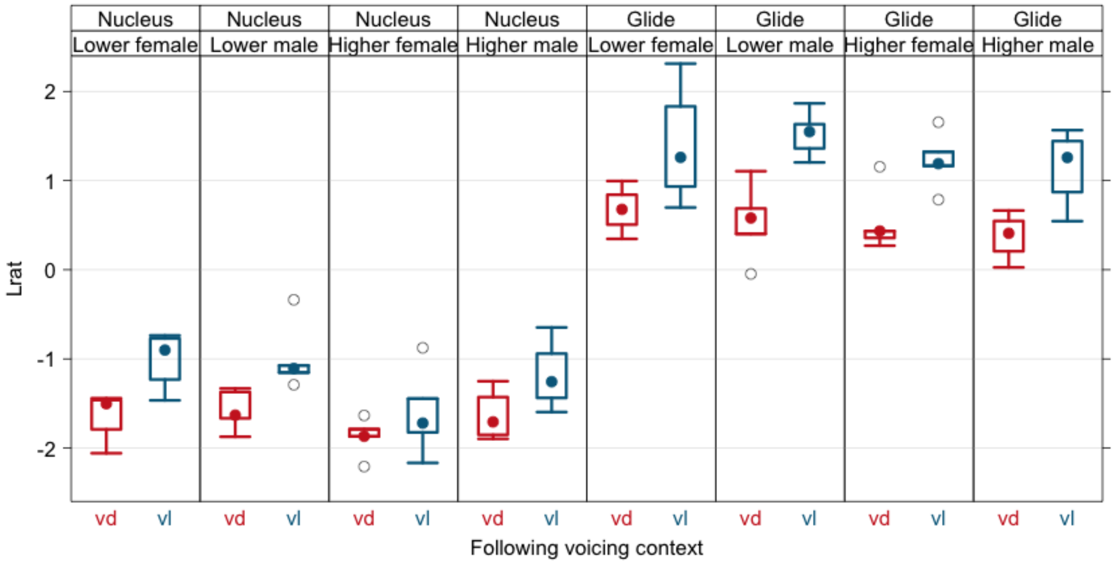

Figure 4.19: Log ratios for MOUTH in the citation form dataset by time point, social group and voicing context; based on speaker means

Two separate mixed-effects model analyses were performed for log ratios in the map task and in the citation form data, with fixed factors time point, voicing context, social class, and gender. The results are listed in table 4.24. For log ratios in the map task data, the three-way interaction between time point, voicing context and gender failed to reach significance, but there were significant main effects of both time point and voicing context. For log ratios in the citation form data, there was a significant interaction between time point and voicing contexts, and post-hoc tests revealed that the contrast between pre-voiced and pre-voiceless contexts was significant only in the glide ($coef = -0.40; chisq = 5.9; p < 0.05$).

Table 4.24: Mixed model analysis results; map task and citation form data: *Lrat* in MOUTH by time point (nucleus, glide), voicing context (pre-voiced, pre-voiceless) and social class (lower-class, higher-class) and gender (female, male

Dependent variable **Significant factors**	**F**	**(df)**	**p-value**	
Lrat (map task)				
Time point	43.1	$(1, 13.4)$	< 0.001	***
Voicing context	22.2	$(1, 10.4)$	< 0.001	***
Time point : Voicing context : Gender	3.8	$(1, 551.0)$	$= 0.053$	
Lrat (citation form)				
Time point	196.0	$(1, 14.7)$	< 0.001	***
Time point : Voicing context	6.8	$(1, 26.8)$	< 0.05	*

PRICE For PRICE in the map task setting, pre-voiced and pre-voiceless contexts appear to be clearly differentiated in both nucleus and glide position. Variation within the social groups displayed in figure 4.20 is smaller compared to the context of MOUTH. While none of the speakers showed raised pre-voiceless nuclei to the extent that corresponding mean log ratios were greater than zero, many speakers produced weakened glides with log ratios below zero, especially among the lower-class males and higher-class females. For the latter, however, the lowering of pre-voiced glides coincides with comparatively low values also in pre-voiceless contexts. A similar situation is found for log ratios in nucleus position, where values for males and higher-class speakers tend to be higher than those for females and lower-class speakers, but, again, this is not necessarily restricted to either voicing context.

The difference between pre-voiced and pre-voiceless PRICE is not notably smaller in the citation form data compared to the map task data (see figure 4.21). Also, there remains a tendency for males to produce higher nuclei in pre-voiceless contexts and for lower-class males and higher-class females to exhibit lower glides.

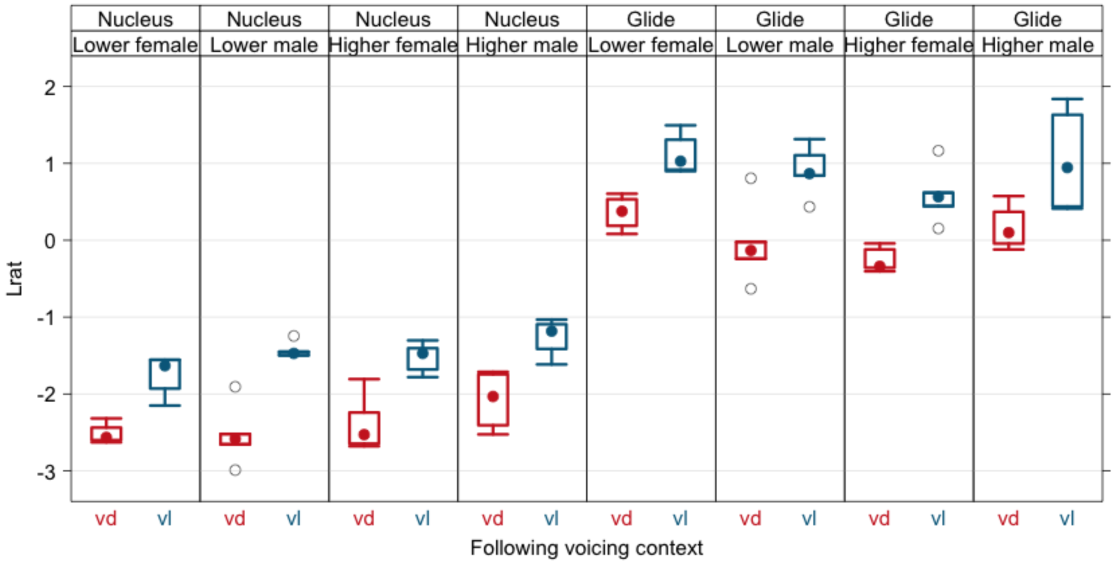

Figure 4.20: Log ratios for PRICE in the map task dataset by time point, social group and voicing context; based on speaker means

As for MOUTH above, two mixed model analyses were conducted for PRICE, one each to test for constraints on the variability of log ratios in the map task and in the citation form data; fixed factors included time point, voicing context, social class and gender. The results are listed in table 4.25. For log ratios in the map task data, the analysis revealed significant main effects of both time point and voicing context. For log ratios in the citation form data, the tests showed a significant interaction between all fixed factors. An analysis of simple main effects showed that the contrast between voicing contexts was significant for all time points, social classes and genders (see table 4.26); individual contrasts involving the factors social class or gender did not show to be significant. A contrast-between-contrast analysis for the voicing context and time point with fixed values for gender and social class revealed that, for female lower-class speakers only, the contrast between pre-voiced and pre-voiceless contexts was greater in the glide than in the nucleus $(coef = 0.64; chisq = 10.6; p < 0.01)$.

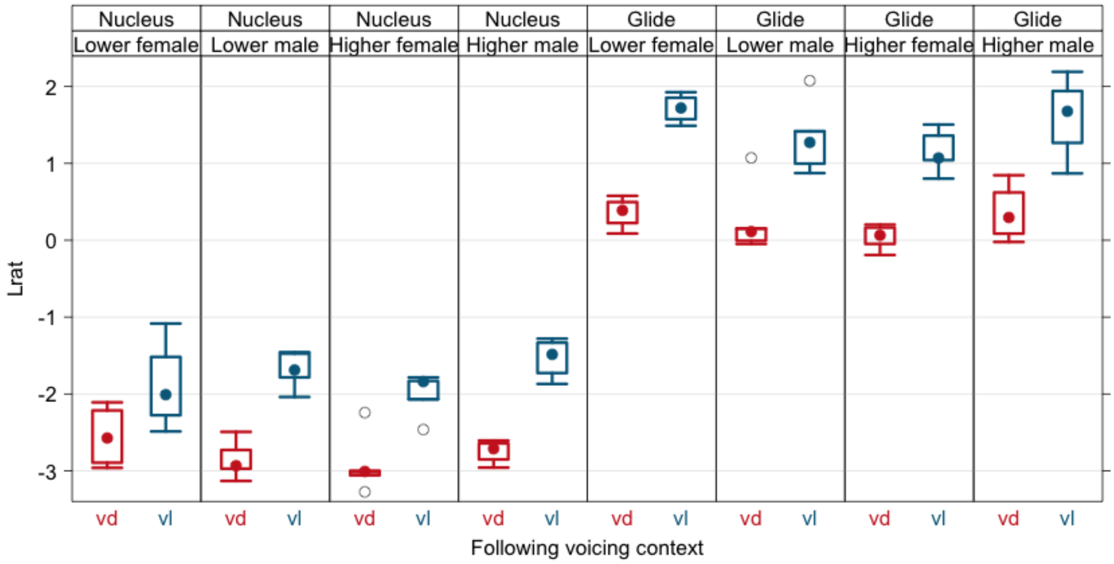

Figure 4.21: Log ratios for PRICE in the citation form dataset by time point, social group and voicing context; based on speaker means

Table 4.25: Mixed model analysis results; map task and citation form data: *Lrat* in PRICE by time point (nucleus, glide), voicing context (pre-voiced, pre-voiceless) and social class (lower-class, higher-class) and gender (female, male

Dependent variable **Significant factors**	**F**	**(df)**	**p-value**	
Lrat (map task)				
Time point	218.9	(1, 25.0)	< 0.001	***
Voicing context	20.9	(1, 33.3)	< 0.001	***
Lrat (citation form)				
Time point	807.4	(1, 20.3)	< 0.001	***
Voicing context	104.9	(1, 16.5)	< 0.001	***
Social class : Gender	4.8	(1, 14.0)	< 0.05	*
Time point : Gender : Voicing context	10.3	(1, 863.7)	< 0.01	**
Time point : Social class : Gender : : Voicing context	4.4	(1, 861.9)	< 0.05	*

Table 4.26: Post-hoc test results: Analysis of simple main effects for four-way interaction in table 4.25 for dependent variable Lrat (citation form)

Main effect: contrasted levels **Context of significant contrasts**	**Coef.**	**Chisq(df=1)**	**p-value**	
Voicing context: pre-voiced – pre-voiceless				
nucleus; female, lower-class	−0.71	15.1	< 0.01	**
nucleus; female, higher-class	−0.94	30.4	< 0.001	***
nucleus; male, lower-class	−1.20	51.8	< 0.001	***
nucleus; male, higher-class	−1.25	49.5	< 0.001	***
glide; female, lower-class	−1.35	58.4	< 0.001	***
glide; female, higher-class	−1.13	48.0	< 0.001	***
glide; male, lower-class	−1.09	47.1	< 0.001	***
glide; male, higher-class	−1.28	56.0	< 0.001	***

4.2.6 Summary

In the previous sections, the results of an acoustic analysis of the diphthongs in MOUTH and PRICE in urban BahC in three speech styles were presented. In formal speech, that is in the most standard-near realisations, MOUTH and PRICE are a pair of fairly symmetrical, wide diphthongs, gliding from a mid low position close to TRAP in the direction of high back GOOSE and high front FLEECE, respectively. While the standard forms of MOUTH and PRICE may, thus, be described as mirror images of each other, the pattern of contextual, social and stylistic variation served to clearly set the diphthongs apart.

The diphthong in PRICE showed consistent voicing-conditioned variation in both nuclei and glides in all speech styles. Although the contrast between pre-voiced and pre-voiceless tokens was larger in conversational speech than in map task speech, stylistic variation did not affect the extent of differentiation by following voicing context so much as it affected the overall extent of gliding movement in both voicing contexts: Glides in citation form PRICE were higher/more peripheral than in map task speech, and nuclei in citation form were lower/more central than in map task and conversational speech. In map task speech, a number of speakers, predominantly lower-class males and higher-class females, produced relatively low glides in PRICE, but, as the pre-voiced weakening in glides coincided with extremely low, central nuclei, the overall gliding movement was still extensive. Social variation within the different speech styles was minimal and did not show a consistent pattern. In the conversational data, lower-class males produced overall higher and more peripheral tokens of PRICE than higher-class females. In citation form, PRICE was characterised by a complex interaction involving both gender and social class, but the size of the effect was relatively small.

For MOUTH, the extent of differentiation between pre-voiced and pre-voiceless contexts was at times considerable, but it was also accompanied by a great deal of variability, both within and across speech styles and, indeed, even within speakers. Across speech styles, the effect of voicing context was initially found to be significant only in glides in the map task and citation form data. Pre-voiceless nuclei in the conversational data were significantly higher/more peripheral than those in the citation form data, and the contrast between pre-voiced and pre-voiceless nuclei was highest in the conversational and lowest in the citation form data, but the voicing-conditioned contrast in the nucleus itself was not significant. On closer inspection, it became clear that this lack of significance could be accounted for by extensive social variation in the conversational dataset, whereby lower-class speakers produced significantly higher pre-voiceless nuclei, quite distinct from those in pre-voiced contexts, than higher-class speakers. To some extent, the same tendency could also be observed in the map task data, but it failed to reach significance; instead, pre-voiceless vowel tokens were found to be significantly higher/more peripheral than their pre-voiced counterparts in general. Glides in pre-voiced contexts in map task speech tended to be relatively low; for the majority of speakers in this speech style, glides in MOUTH rarely extended beyond a log ratio of zero, which means the vowels ended in a quality that was closer to TRAP than to GOOSE. In the citation form data, the effect of voicing context was only significant in glides.

An interesting aspect of the apparent voicing-conditioned allophony in MOUTH is the extreme degree of pre-voiceless raising of the nuclei exhibited by some speakers. Seven out of ten lower-class speakers in the conversational dataset raised 50% or more of pre-voiceless nuclei of MOUTH to such an extent that they were closer to GOOSE than to TRAP. Of these speakers, two, Johnny and Shanae, exclusively produced such extremely raised pre-voiceless tokens, and one, Sharon, displayed at least 50% extremely raised tokens in both pre-voiceless and pre-voiced contexts, her pronunciation reminiscent of the typical realisation [ɔu] of MOUTH in many Atlantic creoles. In map task speech style, four out of eighteen speakers displayed 50% or more extremely raised tokens of pre-voiceless MOUTH, two of which were classified as higher-class speakers. Such a high amount of extremely raised tokens of MOUTH is a quite noticeable feature of non-standard Bahamian speech, and some speakers indicated their linguistic awareness explicitly. For instance, one of the participants, Ada01, remarked: “We say ‘sit on the couch [ɔu]’ – ‘couch [ɔu]’. It’s ‘couch [au]’ - but ‘sit on the couch [ɔu]’.” The straightforward association of pre-voiceless raising in MOUTH with urban BahC and the concomitant stigmatisation serve to explain the social distribution of the feature in conversational speech as well as the stylistic variation across speech styles.

4.3 CHOICE and NURSE

Wells (1982, 150-151) defines the standard lexical set CHOICE as comprising those words whose citation form in RP and GA has the stressed vowel /ɔɪ/. Phonetically, /ɔɪ/ is a wide diphthong with a mid, back, rounded starting-point, gliding towards a higher, fronter, unrounded quality close to [ɪ]. In most cases, the vowel in CHOICE derives from Middle English /ɔi/ or /ui/ in words such as *boy*, *noise* and *join*, the majority of which are believed to be ultimately loan-words from Old French. A few words with Middle English /iː/, usually the source of the PRICE vowel, also became CHOICE words, for example *hoist* or *groin*. The historical interaction between CHOICE and PRICE is described in detail in Wells (1982, 208-210). Apparently, the subset of CHOICE words derived from Middle English /ui/ were at one time realised as [əi ~ ʌi], which led to confusion between these words and PRICE words. The fluctuation of these words between PRICE and CHOICE lasted for several centuries, until they finally settled with CHOICE in the nineteenth century. In this confusion, some words with Middle English /iː/, which ought to have developed as other PRICE words, got attracted into the CHOICE lexical set. Today, some accents of English still reflect a merger or partial merger of the two diphthongs. In parts of the south of England, [ɒɪ] may be used for both CHOICE and PRICE, and in the Caribbean, diphthongs of the [aɪ ~ ɑɪ] type are found.

The standard lexical set NURSE is defined by Wells (1982, 137-140) as comprising those words whose citation form in RP and GA has the stressed vowel /ɜː/ and /ɜr/=[ɝ], respectively. Phonetically, NURSE is a relatively long, mid central, unrounded vowel in both reference accents, but it is r-coloured only in rhotic GA. There are three common Middle English sources of NURSE, short /i/, /ɛ/ and /u/, but only in contexts where these vowels were directly followed by tautosyllabic, that is word-final or pre-consonantal, /r/. Example words, which in their spelling often still reflect their diverse origins, include *first*, *stir*, *verb*, *earth* and *hurt*. From these Middle English roots, the vowel in NURSE reached its present quality through a number of developments further detailed in Wells (1982, 199-203). These include the (first) NURSE merger, Pre-R Lengthening and, in RP and other non-rhotic accents, R Dropping. The NURSE merger started in the 15th century in northern and eastern dialects of English; it progressed and spread throughout the following two centuries, whereby the three Middle English vowel qualities gradually merged in approximately [ə] in the environments of tautosyllabic /r/. Pre-R Lengthening can be dated to the seventeenth century; it affected all mid and low vowels in the environment of following /r/ plus a consonant or morpheme boundary, including NURSE. In RP and other non-rhotic accents, non-prevocalic /r/ was subsequently lost. In GA, though not necessarily in other rhotic accents, vowel length distinctions were neutralised and the phoneme sequence /ɜr/ coalesced in [ɝ]. The realisations of NURSE today vary most obviously with respect to rhotacisation, with r-coloured variants being used in most rhotic merged-NURSE accents and even in some accents which are usually, that is in all other contexts, non-rhotic. In many Irish and Scottish accents, the NURSE merger was not completed and their vowel inventories lack the NURSE vowel as a distinct phonemic entity. Even in accents which have undergone the NURSE merger, NURSE may be qualitatively equivalent to the vowel in STRUT.

4.3.1 CHOICE and NURSE in Bahamian varieties

Table 4.27 lists the vowel qualities of BahC as proposed by Wells (1982), Holm and Shilling (1982) (HS), and Childs and Wolfram (2004)(CW), comparing them to variants in a selection of associated varieties (Edwards, 2004; Blake, 2004; Devonish and Harry, 2004; Weldon, 2004; Youssef and James, 2004; Thomas and Bailey, 1998). In more basilectal Caribbean varieties, the diphthong in CHOICE tends to be produced with a fronted, unrounded and possibly lowered first element, in which case it may merge with PRICE. This occurs in Bajan, Jamaican Creole and in Gullah; it is also a variant found in Tobagonian, the basilectal sister variety of Trinidadian. For BahC, Wells and CW propose a fairly invariant diphthong in CHOICE with a back, mid, rounded starting-point, gliding towards a high, front, unrounded quality. Only HS suggest that the first element may be unrounded and possibly fronted, but it is still clearly distinct from the vowel in PRICE, which they transcribe as /aɪ/. With respect to CHOICE, most authors, thus, agree that BahC is more similar to AAVE than to creole varieties. In AAVE, the glide in CHOICE may be weakened before voiced obstruents, but, compared to glide deletion in PRICE, prevalent throughout the American South, this is a fairly rare occurrence and usually restricted to the environments preceding /l/ (Labov et al., 2006, 251).

In the North American context, rhotic pronunciation of NURSE is the norm, and one of the defining characteristics of AAVE is its persistent r-lessness in syllable

Table 4.27: Suggested vowel qualities in BahC and associated varieties.

	Bahamian Creole			Caribbean varieties			US varieties	
Lexical set	Wells	HS	CW	Bajan	TrinC	JamC	Gullah	AAVE
CHOICE	ɔɪ	ʌɪ ~ ɔɪ	ɔi	ʌɪ ~ oɪ	ɔɪ	ai ~ ɔi	ɐɪ ~ ɔɪ	oɪ ~ ɔɪ
NURSE	ɔɪ ~ ɜː	ʌɪ ~ ʌ	ɔi ~ ɜ	ɤ	ɔ ~ ʌ ~ ɜ(ː)	o ~ əː	ɑ ~ ʌ	ɤ ~ ɜ ~ ɝ

codas such as in START and its variable r-lessness in stressed, nucleus position as in NURSE. In table 4.27, the rhotic variant of NURSE in AAVE is transcribed as /ɝ/, which indicates an r-coloured vowel quality, or, in Wells' words (1982, 202-203), the coalescence of two phonemes /ɜ/ and /r/. Other phonemic interpretations of the same phonetic quality found in the literature include the phoneme sequence /ɜr/ and syllabic /r/=[ɹ̩]. This is important to note, because the symbols used in table 4.27 to represent NURSE variants in the creole varieties appear to consistently indicate non-rhotic pronunciation. However, Bajan and acrolectal JamC are described as rhotic, and basilectal JamC as variably rhotic, where coda /r/ is limited to certain phonological contexts (Devonish and Harry, 2004, 470-471). TrinC and Gullah are traditionally non-rhotic. Creole varieties may, thus, differ with respect to the realisation of coda /r/. In non-rhotic basilectal creole forms, NURSE may be backed and variably rounded, merging with the vowel in STRUT.

BahC is consistently described as non-rhotic. It differs from other Caribbean creoles in that non-standard NURSE is not realised as a backed monophthong; instead, it may be produced as a front- and upgliding diphthong, merging or partially merging with the vowel in CHOICE. This may lead to (near-)homophones in words like *verse* and *voice*. There is some disagreement as to how similar productions of CHOICE and NURSE really are and how similarity is achieved. While Wells proposed that realisations of NURSE approach and merge with those of CHOICE in the speech of lower social classes, HS suggested that both diphthongs vary socially and, in 'less educated' speech, they converge in a vowel quality close to [ʌɪ] (see also Shilling, 1980, 141). CW proposed that productions of NURSE may approximate those of CHOICE, but the diphthong onset of the former never reaches the same backed position of the latter.

4.3.2 Non-rhotic pronunciation in North America

Since the late 17th century, the default value in northern North American dialects was consistent r-full pronunciation. Pockets of non-rhotic pronunciation centred around all major eastern sea-board cities, with the exception of Philadelphia and Baltimore (Labov et al., 2006, 47, 49, 240). The New York City English vernacular was consistently non-rhotic until the first half of the 20th century and r-lessness used to be characteristic of New Yorkers of all social classes. Following World War II, Labov (2006) observed a uniform shift towards a more positive evaluation of r-fullspeech, reflected in a clear pattern of social and stylistic stratification and in the increased use of rhotic variants, especially by younger upper middle-class speakers. Gordon (2004, 288) claimed that, today, non-rhotic pronunciation in New York City is stigmatised; it has become a strong social marker of the lower and working classes and the general trend towards rhoticity continues to progress. Labov et al. (2006, 47), however, argued that non-rhotic pronunciation still characterises New York City as well as eastern New England vernaculars and a notable increase in rhotic pronunciation can be observed mainly in formal speech styles. This presumably contrasts with the rapid generational change in the use of /r/ in the American South.

Traditionally, non-rhoticity was prestigious in the American South, appearing most frequently in the speech of higher social classes and correlating geographically with former plantation areas. Before World War II, non-rhotic pronunciation predominated in a band stretching from Virginia, the Carolinas and Georgia westwards towards regions in Kentucky, Tennessee, Alabama, Mississippi, Louisiana and Texas. Since then, r-full pronunciation has swept the entire region in all styles of speech. Today, even in areas that were once strongholds of non-rhoticity, young white Southerners are predominantly rhotic, and young females especially seem to have forged ahead in this change (Thomas, 2004, 318). Rhoticity in Southern English has been studied extensively and shows rich contextual and well as ethnic variation. While the realisation of post-vocalic /r/ is usually treated as a binary variable, that is in terms of the presence or absence of coda /r/, it shows continuous gradation form fully rhotic to fully non-rhotic variants. Regarding the phonetic context, non-rhoticity is most common in unstressed syllables as in *letter*, where r-less pronunciation also occurs in normally rhotic varieties. The next most frequent context for non-rhoticity is in syllable codas, whether followed by a tautosyllabic consonant as in *hard* and *fourth* or word-finally as in *bar* and *four*. Linking-r was historically absent from Southern speech. Moreover, non-rhoticity tends to be more frequent following front than back vowels. The context that is most conducive to rhotic pronunciation is in stressed, syllabic position, i.e. in NURSE (e.g. Thomas, 2004, 317; Bailey and Thomas, 1998, 90). Although rhotic pronunciation has increased dramatically in the speech of white Southerners over the last century, AAVE remains largely non-rhotic. Bailey and Thomas (1998, 90-91) showed that r-full pronunciation is also spreading in the speech of African Americans, especially in the context of NURSE words, but it appears to progress at a slower rate than in white speech. In their sample of black and white speakers from Texas, younger AAVE speakers were still more non-rhotic than older white speakers. In stressed syllabic, i.e. NURSE, contexts, older African Americans produced rhotic forms in 16% of all cases, younger African Americans in 20%, older whites in 31% and younger whites in 100%. In coda /r/ contexts, the proportion of rhotic tokens dwindled to half or less than half of the proportion in NURSE contexts, except for younger white speakers, who still produced 93% rhotic tokens.

As was indicated in section 4.3.1 above, American English-lexifier creoles do not all share a distinctly rhotic or non-rhotic pronunciation. Bajan is, "if anything, more rhotic than North American [Standard English]" (Van Herk, 2003, 260), while the creoles spoken in Trinidad and in the Bahamas are traditionally non-rhotic. In Guyana, rhotic pronunciation varies across geographical space (Aceto, 2004, 485). In basilectal JamC, post-vocalic /r/ occurs variably in the context of preceding /a/ or /o/ if not followed by a tautosyllabic consonant, while acrolectal JamC is described as mainly rhotic (Devonish and Harry, 2004, 470-471, 476). Gullah, like TrinC and BahC, is traditionally non-rhotic, but Weldon (2004, 402) observed that modern-day Gullah may show some incipient r-fullness, presumably due to the influence of neighbouring varieties as well as American Standard English. Bahamians, too, have had a long history of exposure to non-creolised American English varieties, and Hackert (2004) noted that this may have had considerable influence on what Bahamians perceive as the standard pronunciation: "Even though both BahCE and standard Bahamian English are non-rhotic, many – particularly younger – Bahamians perceive r-full American pronunciations as 'correct' and imitate them" (59). Bahamian writer and cultural critic Patricia Glinton-Meicholas, however, contends that, as of 1994, rhotic pronunciation is not truly characteristic of the Bahamian vernacular but merely an affectation found in formal speech:

> When [...] Bahamians wish to impress, they usually affect American vowels and 'r's. [...] If you spend any length of time here, you realize that a pronounced 'r' is as common to a Bahamian as a pinky ring to an elephant. In fact, the average Bahamian would feel right at home in Boston with 'Hahvahd Yahd'. (Glinton-Meicholas, 1994, 34)

4.3.3 Upgliding diphthong in NURSE

Donnelly (1997) described the front- and upgliding central diphthong in NURSE as a "true marker" of basilectal Bahamian speech. It is perceptually salient, socially stigmatised, and anyone "aspiring to be a news reader on the national television station ZNS would have to eliminate such pronunciations" (23). While diphthongal realisations of NURSE are conspicuously absent from other Caribbean creoles and do not occur in the varieties of the British Isles (Wells, 1982, 139), it was once a more widespread feature found in a number of non-rhotic North American mainland varieties.

The upgliding diphthong in words like *bird*, *shirt*, and *worm*, that is where the NURSE vowel is followed by a tautosyllabic consonant, is a well-known stigmatised feature of New York City speech. According to Labov (2006, 213), it has come to symbolise the city's vernacular in folk mythology under the name of 'Brooklynese', popularly evoked in stock phrases like 'toidy toid' for 'thirty third'. Diphthongal NURSE, which may be phonetically represented as [əɪ], was a pronunciation used regularly by New Yorkers of all social classes in the late 1900s. For some speakers, a similar variant was likely used for the vowel in CHOICE, resulting in homophones such as *voice–verse* and *oil–Earl*. For reasons that are not entirely clear, the diphthong met with an extreme form of social pressure from above during the early decades of the 20th century, resulting in a rapid decline in the use of this variant in all speech forms. Labov's data from the mid-1960s indicated that the feature was clearly recessive even then. Whereas 59% of the speakers between the ages of 50 and 59 produced diphthongal tokens of NURSE, only 4% of the speakers under the age of 20, two out of 51 and both members of the lower working class, showed any use of the form at all (Labov, 2006, 215). The once common diphthongal variant had become a highly stigmatised marker of lower class speech. In New York City today, it is almost extinct. Labov (2006) argued, however, that it lingers on in the use of "a palatalized form of a well contracted, mid central [r]" (216).

While the historical origin of diphthongal NURSE is unclear, it is certain that New York City speech was not the only variety in which this variant was used. According to Thomas (2004, 309), an upgliding form, which he transcribed as [ɜɪ], once predominated in white settler accents throughout the American South from the Lower East Coast to Texas and north to eastern Arkansas. As can be seen in map 25 in Kurath and McDavid (1961), an especially solid concentration could be found in South Carolina, where 'cultivated' as well as 'uncultivated' adult speakers at the time used the variant with perfect regularity. As white Southern speech became increasingly rhotic during the second half of the 20th century, non-rhotic forms of NURSE, including monophthongal as well as diphthongal variants, gradually disappeared. Thomas (2004, 309), based on data from his large-scale investigation into North American vowel systems (Thomas, 2001), concluded that today only few speakers born after 1930 use an upgliding diphthong in NURSE and it is, thus, all but obsolete.

The realisation of NURSE as an upgliding diphthong in North American mainland varieties was reported to have been restricted to contexts in which the vowel was followed by a coda consonant other than /r/ (see e.g. Thomas, 2004; Labov, 2006). In BahC, Wells' (1982) informant argued that NURSE may also be diphthongised in open syllables, i.e. *stir* may rhyme with *toy*. Holm (1983), however, described the scope of the phenomenon as limited to contexts that correspond to "American standard /ɜr/ or /ər/ before a consonant" (310). Descriptions of the phonetic quality of the starting-point of the diphthong in NURSE are extremely variable, ranging form [ə, ʌ] to rounded [ɵ] and back, rounded [ɔ]. It is likely that a quality this variable may be especially malleable regarding the coarticulatory effect of preceding consonants.

4.3.4 Research questions and hypotheses

BahC is traditionally non-rhotic, but if the same social pressure affecting AAVE and other varieties of English in the American South also has an impact on speech in the Bahamian context, Bahamian speakers may show variably rhotic pronunciations.

1. More rhotic tokens of NURSE will be found in the citation form data than in the map task data, and more rhotic tokens will be found in the map task data than in the conversational data.

2. More rhotic tokens of NURSE will be found for higher-class than for lower-class speakers.

3. More rhotic tokens of NURSE will be found for female than for male speakers.

Diphthongal variants of non-rhotic NURSE are expected to show social and stylistic variation. How can the nature and extent of the (partial) merger of CHOICE and NURSE be characterised?

1. The degree of diphthongisation in NURSE will be greater in the conversational data than in the map task data, and greater in the map task data than in the citation form data.

2. The degree of diphthongisation in NURSE will be greater among lower-class than higher-class speakers.

3. Can diphthongal variants of NURSE be found in open syllables?

4. How does the extent of spectral change in NURSE compare to that in CHOICE?

5. How does the overall spectral position of NURSE compare to that of CHOICE?

6. What phonetic context effects can be discerned, in particular with respect to the place of articulation of the preceding consonant?

4.3.5 Analysis procedure

All analyses were restricted to vowels in maximally bisyllabic words and with durations of minimally 75 ms. Pre-nasal and pre-liquid contexts were avoided as well as tokens following /r/ or semivowels. For NURSE in CVC syllables in the map task and citation form speech, the following consonantal context was restricted to alveolar obstruents. Only very few stressed tokens of word-final NURSE were produced by participants in the conversational and map task speech styles. In the conversational data, these were mainly emphatic tokens of the pronoun *her*, while in the map task data only one speaker produced the word *sir* in the expression *Sir Michael Boyce* with lexical stress. Clearly, these tokens cannot be considered representative of word-final NURSE, subsequently referred to as the lexical set SIR, and were therefore excluded from the data. A total of 1805 tokens were finally submitted to further analysis, 809 for CHOICE, 926 for NURSE and 70 for SIR (see table 4.28). Prior to acoustic analysis, all tokens of NURSE and SIR were auditorily classified as rhotic or non-rhotic, and only spectral measures of the latter were considered in this study.

Table 4.28: Number of tokens by lexical set, rhoticity and speech style

Lexical set	**Rhoticity**	**Conversational**	**Map task**	**Citation form**
CHOICE	–	62	216	531
NURSE	Non-rhotic	197	113	95
	Rhotic	2	178	341
SIR	Non-rhotic	–	–	3
	Rhotic	–	–	67
Total		261	507	1037

In order to quantify the relative position of NURSE and CHOICE in the speakers' vowel spaces and to asses the amount of spectral change from vowel onset to offset in the F1 and F2 dimensions jointly, log ratios of Euclidean distances were calculated which represent the relative distance to the means of THOUGHT and FLEECE. This procedure is essentially the same as the one that was used in section 4.2.4 in the quantification of the voicing-conditioned allophony in MOUTH and PRICE. For each time point between 10% and 90% at 10%-intervals into a given vowel token, two Euclidean distances were computed, based on the raw Hertz values of F1 and F2: $ed1$, the distance to the mean of THOUGHT, and $ed2$, the distance to the mean of FLEECE. The ratio of these two distances, $ed1/ed2$, indicates how close the vowel token at this particular point in time is to THOUGHT in relation to FLEECE. The logarithm of this ratio, $Lrat = log(ed1/ed2)$, gives the same information in a more convenient form: If a measurement point is closer to THOUGHT, the log ratio is negative; if it is closer to FLEECE, the log ratio is positive. A log ratio of zero would indicate that the vowel token at this time point is exactly equidistant between THOUGHT and FLEECE.

4.3.6 Results

4.3.6.1 Rhoticity in NURSE

Rhotic pronunciation of NURSE in the conversational data was almost completely absent. The only speaker who did produce r-full NURSE was the higher-class speaker Mrs Smith, and even she only did so in two out of 14 tokens. These two rhotic tokens of NURSE were subsequently removed from the dataset.

In the map task data, rhotic NURSE was clearly the norm for higher-class speakers in general, though females showed slightly lower rates of r-full pronunciation than males (see table 4.29). Lower-class females showed almost categorical non-rhoticity, whereas lower-class males showed, at a rate of about 60%, a tendency to favour rhotic NURSE. In the citation form data (see table 4.30), higher-class speakers showed almost categorically r-full pronunciation, irrespective of gender. The use of rhotic NURSE also increased in the speech of lower-class participants, especially for the lower-class females, whose rates increased by 40% in citation form relative to map task speech.

Table 4.29: Rhotic tokens of NURSE in the map task data by social class and gender

Social group	Total number of tokens	Prop. of rhotic tokens
Lower-class females	62	3.3%
Lower-class males	87	59.8%
Higher-class females	89	82.0%
Higher-class males	53	96.2%

Table 4.30: Rhotic tokens of NURSE in the citation form data by social class and gender

Social group	Total number of tokens	Prop. of rhotic tokens
Lower-class females	97	43.3%
Lower-class males	120	70.8%
Higher-class females	115	98.3%
Higher-class males	104	97.1%

A generalised linear mixed-effects model was fit to the map task and citation form data with dependent binomial variable rhotic versus non-rhotic NURSE and fixed factors speech style, social class and gender. The results of type II Wald chi-square tests are listed in table 4.31. The final model revealed a significant interaction between speech style and gender, while the interaction between gender and social class missed significance with a p-value of approximately 0.053. An analysis of simple main effects was conducted for both interaction terms. These showed that the contrast between map task and citation form style was significant for female speakers ($coef = 0.024; chisq = 16.6; p < 0.001$) and the contrast between genders was significant in map task style ($coef = 0.039; chisq = 14.7; p < 0.001$). The difference between lower- and higher-class productions was significant for both female ($coef = 0.002; chisq = 31.5; p < 0.001$) and male ($coef = 0.032; chisq = 10.4; p < 0.01$) speakers, and the contrast between genders was significant for lower-class speakers ($coef = 0.031; chisq = 12.5; p < 0.01$).

Table 4.31: Generalised mixed model analysis results; map task and citation form data: Dependent binomial variable rhoticity in NURSE (rhotic=1, non-rhotic=0) by style (map task, citation form), social class (lower-class, higher-class) and gender (female, male)

Dependent variable **Significant factors**	**Chisq**	**(df)**	**p-value**	
Rhoticity in NURSE				
Style	13.4	(1)	< 0.001	***
Gender	11.4	(1)	< 0.001	***
Social class	35.8	(1)	< 0.001	***
Style : Gender	4.6	(1)	< 0.05	*
Gender : Social class	3.7	(1)	$= 0.053$	

The above analysis of rhoticity in NURSE was based on non-word-final NURSE vowels only. In citation form speech, a total of 70 tokens of word-final NURSE were produced, and all but three were clearly rhotic. All following analyses are based on non-rhotic tokens of NURSE only. Therefore, word-final NURSE was removed from further analysis, as were tokens of NURSE produced by higher-class speakers in citation form speech style. In map task speech, male and female higher-class speakers were grouped together.

4.3.6.2 Visual inspection

Figure 4.22 illustrates the spectral change through normalised (i.e proportional) time in the vowels in CHOICE and non-rhotic NURSE in normalised F1×F2 formant space for four speakers and three speech styles. Measurements were extracted at

10% intervals from 20% to 80% into vowel tokens and the trajectories were smoothed for each speaker, style and preceding place of articulation prior to plotting. The speakers were chosen to represent some of the patterns found in the data: NURSE in non-post-labial contexts was fronted and closer to FLEECE relative to NURSE in post-labial contexts. In lower-class and less formal speech, NURSE tended to be more diphthongal than in higher-class and/or more formal speech. Generally, however, spectral movement in CHOICE was more extensive than in NURSE.

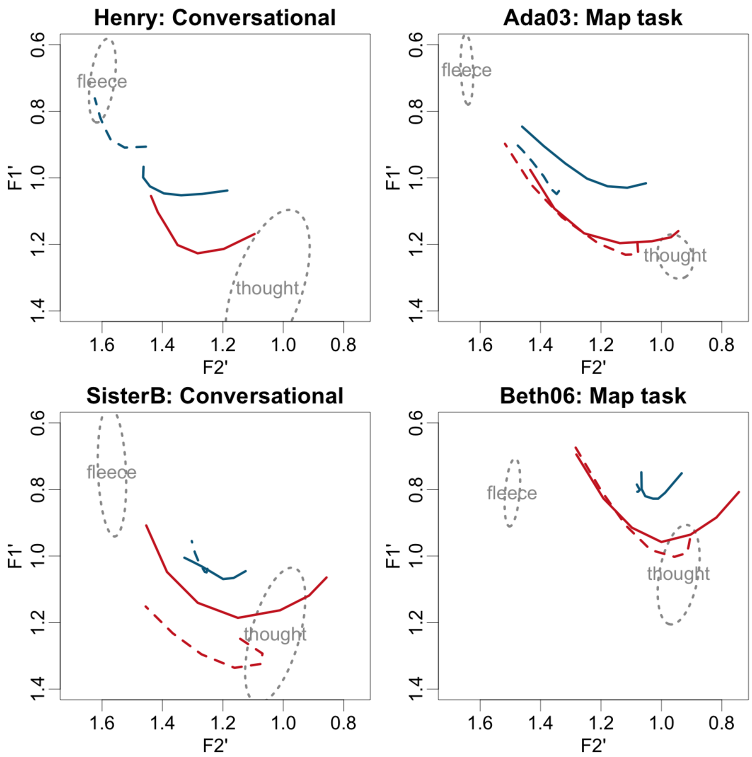

Figure 4.22: Smoothed formant trajectories (F1', F2') of CHOICE (red) and NURSE (blue) in post-labial (full lines) and non-post-labial (dashed lines) contexts for four speakers and three speech styles

4.3.6.3 Variation across speech styles

Figure 4.23 displays mean log ratios at 10% intervals through the vowel in NURSE and CHOICE. Log ratio values were linearly interpolated for each speaker and preceding place of articulation (labial, non-labial/other), and then aggregated by speech style. It appears that the place of articulation of the preceding consonant has a more noticeable impact on the onset of NURSE than on that of CHOICE. In post-labial contexts, roughly the first half of the vowel in NURSE is closer to THOUGHT than in non-post-labial contexts, irrespective of speech style. In both contexts, NURSE in the conversational data glides towards a quality that may be closer to FLEECE than in the more formal speech styles. In the map task and in the citation form data, the nuclei of post-labial CHOICE are also closer to THOUGHT than those in non-post-labial contexts, but the difference between the two contexts is much smaller than in NURSE. Nuclei in CHOICE are successively closer to THOUGHT in more formal styles, and glides are closer to FLEECE in the citation form data than in the other speech styles. In all speech styles and contexts, there remains a clear difference between the vowels in NURSE and CHOICE. While the overall extent of gliding movement from vowel onset to offset may be similar, especially in post-labial contexts in the conversational data, the spectral change across time patterns differently: In diphthongal NURSE, most formant movement occurs in the interval from vowel onset to about 60% into the vowel; in CHOICE, it is the central part of the diphthong, from about 40% to about 70%, which displays the most spectral change.

A mixed-effects model analysis was performed on log ratio values at three time points: the nucleus, defined as the point at maximum F1 between 20% and 40% into a vowel token, the midpoint at 50% into a vowel token and the glide at 80%. Apart from time point, the other fixed factors in the model were speech style (conversational, map task, citation form), lexical set (CHOICE, NURSE), and preceding place of articulation (post-labial, non-post-labial/other). The observed mean values and standard deviations for log ratios in all the combinations defined by the fixed factors in the model are listed in table 4.32. The results of the mixed-model analysis are found in table 4.33.

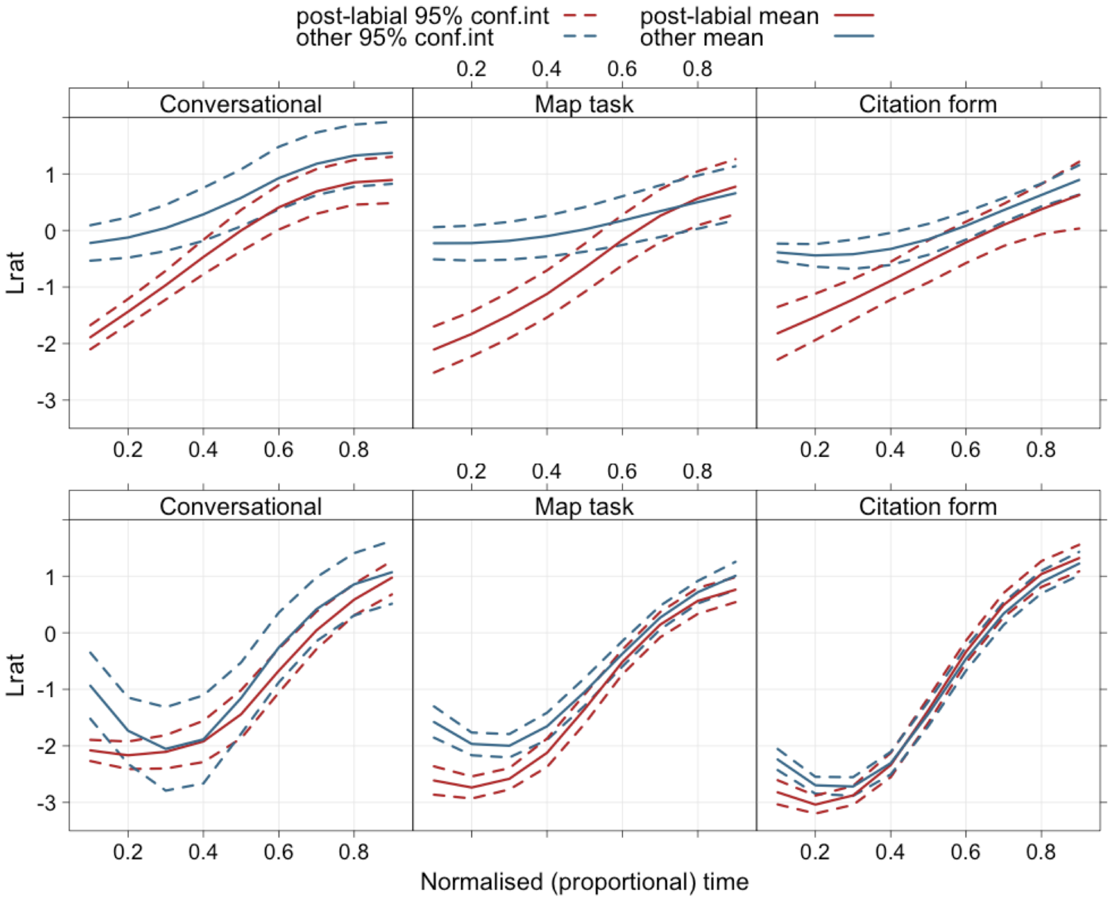

Figure 4.23: *Lrat* measures across time for NURSE (top row) and CHOICE (bottom row) by preceding place of articulation and speech style; means and confidence intervals derived from smoothed speaker values

The analysis revealed significant three-way interactions between speech style, lexical set and time point, between speech style, time point and place of articulation, and between lexical set, time point and place of articulation. Figure 4.24 on page 182 illustrates the predicted effect of the interaction terms which involve the factor lexical set; factors not present in the respective interactions were averaged across all levels. As can be seen in the upper panels in figure 4.24, log ratios in NURSE are higher in the conversational data than in the other two speech styles. Averaged across post-labial and non-post-labial contexts, log ratio values for the nucleus in conversational NURSE are roughly equivalent to those of the midpoint in citation form NURSE. In the citation form data, the 95% confidence interval for log ratios in the glide of NURSE include zero, which confirms a fairly central position between the

Table 4.32: Log ratio means and standard deviations for NURSE and CHOICE at three time points (nucleus, midpoint, glide) by the place of articulation of the preceding consonant and speech style; values derived from all observed tokens

Time point Lexical set	Place of art.	Conversational	Map task	Citation form
Nucleus				
NURSE	Post-labial	-1.12 (0.82)	-1.49 (0.61)	-1.26 (0.51)
	Other	-0.22 (0.82)	-0.22 (0.53)	-0.47 (0.43)
CHOICE	Post-labial	-1.97 (0.85)	-2.37 (0.86)	-2.56 (0.88)
	Other	-1.90 (0.98)	-1.83 (0.76)	-2.46 (0.87)
Midpoint				
NURSE	Post-labial	-0.05 (0.87)	-0.39 (0.80)	-0.48 (0.51)
	Other	0.30 (0.93)	0.00 (0.63)	-0.14 (0.42)
CHOICE	Post-labial	-1.44 (1.04)	-1.32 (0.87)	-1.27 (0.86)
	Other	-1.05 (0.96)	-1.10 (0.79)	-1.38 (0.91)
Glide				
NURSE	Post-labial	0.81 (0.96)	0.73 (0.66)	0.46 (0.55)
	Other	0.97 (1.16)	0.55 (0.82)	0.62 (0.60)
CHOICE	Post-labial	0.59 (0.63)	0.60 (0.67)	1.14 (0.71)
	Other	0.89 (0.72)	0.73 (0.63)	0.97 (0.62)

Table 4.33: Mixed model analysis results: *Lrat* by style (conversational, map task, citation form), lexical set (CHOICE, NURSE), preceding place of articulation (post-labial, non-post-labial) and time point (nucleus, midpoint, glide)

Dependent variable **Significant factors**	**F**	**(df)**	**p-value**	
Lrat				
Style	4.5	$(2, 62.7)$	< 0.05	*
Lexical set	27.9	$(1, 70.7)$	< 0.001	***
Time point	425.5	$(2, 36.9)$	< 0.001	***
Style : Lexical set	5.9	$(2, 61.2)$	< 0.01	**
Style : Time point	14.0	$(4, 81.6)$	< 0.001	***
Lexical set : Time point	112.9	$(2, 52.8)$	< 0.001	***
Time point : Place of art.	12.6	$(2, 26.9)$	< 0.001	***
Lexical set : Place of art.	10.5	$(1, 57.8)$	< 0.01	**
Style : Lexical set : Time point	7.0	$(4, 1347.1)$	< 0.001	***
Style : Time point : Place of art.	2.7	$(4, 1175.5)$	< 0.05	*
Lexical set : Time point : Place of art.	5.8	$(2, 52.3)$	< 0.01	**

lexical sets THOUGHT and FLEECE, while the glide in CHOICE is clearly closer to FLEECE. In the conversational data, the glides in NURSE and CHOICE occupy similar positions relative to THOUGHT and FLEECE – both are clearly closer to FLEECE. In citation form speech, the overall gliding movement in CHOICE is more extensive than in the other speech styles; this is caused by a combination of relatively lower log ratios in the nucleus and relatively higher log ratios in the glide. The lower panels in figure 4.24 illustrate the strong effect the preceding place of articulation has on especially the nucleus in NURSE as opposed to CHOICE, averaged across all speech styles. The nucleus and, to a lesser degree, the midpoint in NURSE are lower in post-labial than in non-post-labial contexts, approximating the position of CHOICE.

In order to assess the extent of overlap between CHOICE and NURSE, an analysis of simple main effects was conducted for the factor lexical set; significant results are listed in table 4.34. In post-labial contexts, the difference between CHOICE and NURSE in the conversational data centred mainly on the vowel midpoint, which was found to have significantly higher log ratios in NURSE than in CHOICE. In the map task and citation form data, nuclei in post-labial CHOICE were significantly closer to THOUGHT than in post-labial NURSE. In non-post-labial contexts, nuclei in CHOICE were significantly closer to THOUGHT than in NURSE for all speech styles, and the same applied to vowel midpoints. While the relative position of post-labial nuclei distinguished conversational from map task and citation form productions, the relative position of glides served to differentiate citation form productions from those in the more informal speech styles: Glides in citation form CHOICE were significantly closer to FLEECE than glides in citation form NURSE, irrespective of the preceding consonantal context. In the conversational and map task data, the difference in the position of glides in NURSE and CHOICE was not significant. A contrast-between-contrast analysis for the levels of lexical set (i.e. CHOICE–NURSE) and the levels nucleus and glide of the factor time point additionally revealed that, in both post-labial and non-post-labial contexts, the difference between nucleus and glide was significantly larger in CHOICE than in NURSE for all speech styles (post-labial, conversational: $coef = -0.83; chisq = 14.8; p < 0.01$; non-post-labial, conversational: $coef = -1.62; chisq = 60.8; p < 0.001$; post-labial, map task: $coef = -1.21; chisq = 28.7; p < 0.001$; non-post-labial, map task: $coef = -2.01; chisq = 121.4; p < 0.001$; post-labial, citation form: $coef = -1.75; chisq = 61.5; p < 0.001$; non-post-labial, citation form: $coef = -2.54; chisq = 221.3; p < 0.001$).

Table 4.34: Post-hoc test results: Analysis of simple main effects for the factor lexical set

Main effect: contrasted levels				
Context of significant contrasts	**Coef.**	**Chisq(df=1)**	**p-value**	
Lexical set: CHOICE – NURSE				
post-labial, nucleus, map task	−0.78	10.5	< 0.05	*
post-labial, nucleus, citation form	−0.84	12.2	< 0.05	*
post-labial, midpoint, conversational	−0.95	13.7	< 0.01	**
post-labial, glide, citation form	0.91	17.1	< 0.01	**
non-post-labial, nucleus, conversational	−1.81	70.8	< 0.001	***
non-post-labial, nucleus, map task	−1.90	92.8	< 0.001	***
non-post-labial, nucleus, citation form	−1.96	101.3	< 0.001	***
non-post-labial, midpoint, conversational	−1.67	53.4	< 0.001	***
non-post-labial, midpoint, map task	−1.48	47.4	< 0.001	***
non-post-labial, midpoint, citation form	−1.22	32.5	< 0.001	***
non-post-labial, glide, citation form	0.58	10.2	< 0.05	*

Regarding variation across speech styles, a contrast-between-contrast analysis for the levels of lexical set (i.e. CHOICE–NURSE) and all pairwise comparisons of the levels of style revealed that, irrespective of the preceding consonantal context, the difference between NURSE and CHOICE in the glide was significantly larger in the citation form data than in both the map task ($coef = -0.48; chisq = 17.1; p < 0.01$) and the conversational data ($coef = -0.77; chisq = 13.9; p < 0.01$). In addition, the difference between CHOICE and NURSE regarding the extent of spectral change from nucleus to glide was significantly larger in citation form speech than in both map task ($coef = 0.53; chisq = 11.5; p < 0.05$) and conversational speech ($coef = 0.92; chisq = 23.8; p < 0.001$), again irrespective of the preceding consonantal context.

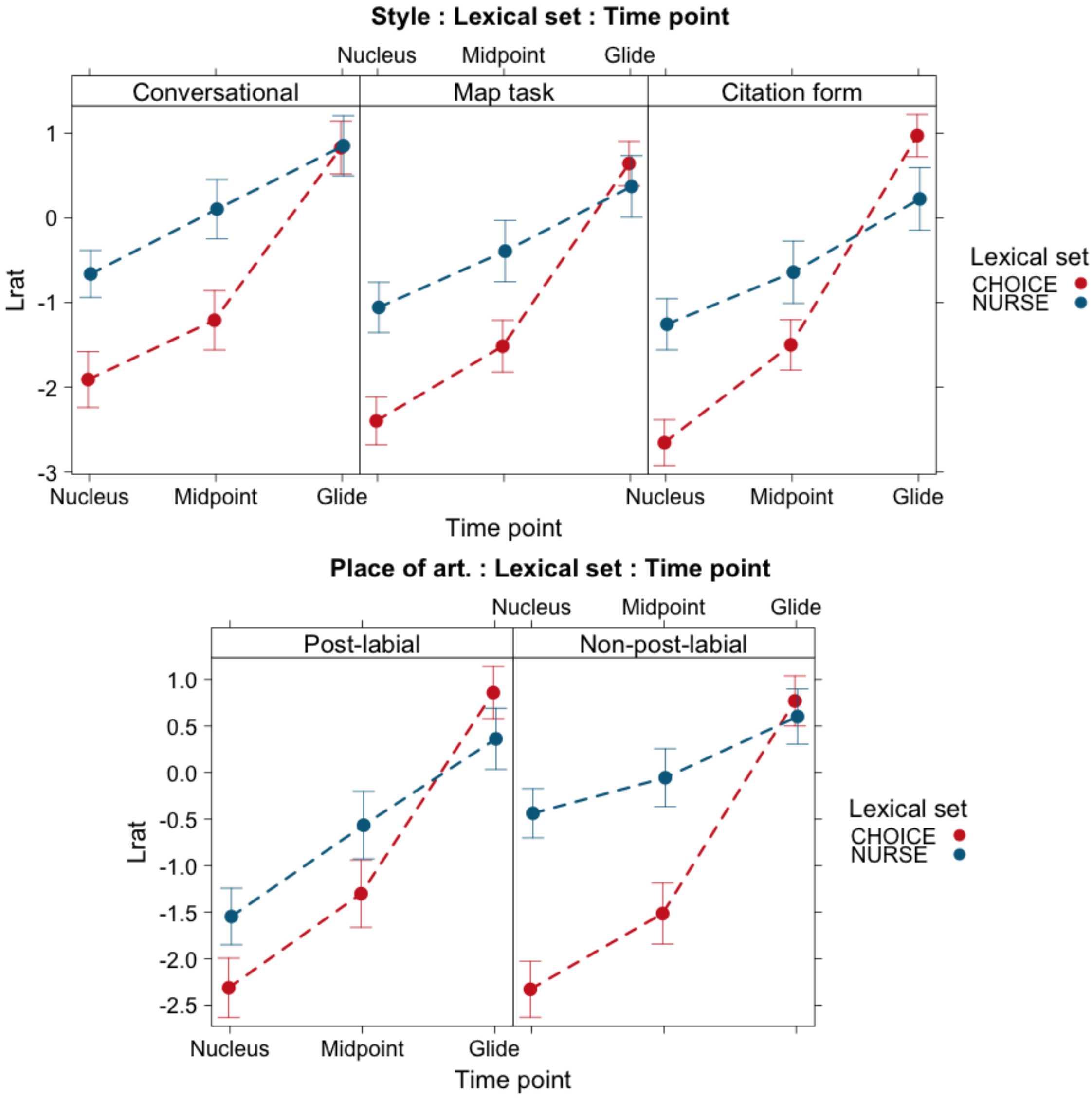

Figure 4.24: Effect plots for significant three-way interactions (see table 4.33) involving the factor lexical set

4.3.6.4 Social variation in the conversational data

Figure 4.25 displays median log ratios and their interquartile ranges for the vowels in CHOICE and NURSE in the conversational data at three time points through the vowel (nucleus, midpoint, glide), aggregated across social group (lower-class females, lower-class males, higher-class females) and preceding place of articulation. In all contexts except in glide position in the speech of higher-class females, log ratios in NURSE are higher than in CHOICE. The place of articulation of the preceding consonant affects the NURSE vowel in all social groups, as the nucleus is consistently closer to THOUGHT in post-labial than in other contexts, but the effect is most salient for lower-class males. For these speakers, NURSE in its entirety is shifted towards FLEECE in non-post-labial contexts, while the overall extent of gliding movement appears relatively unaffected. Relative to female speakers, lower-class males also display higher log ratios in CHOICE, but this is not conditioned by the preceding place of articulation. CHOICE and NURSE appear to be very similar in the speech of lower-class males in post-labial contexts: NURSE spans a relatively wide spectral range and CHOICE, especially in the nucleus and midpoint, has higher log ratios than in other social groups, which leads to a close approximation of the two diphthongs. There remains, however, a solid difference between CHOICE and NURSE in the midpoint. CHOICE and NURSE are maximally different in the speech of higher-class females in non-post-labial contexts: CHOICE is clearly diphthongal with relatively focussed nucleus and glide positions, while log ratios in NURSE are close to zero in all time points.

Two successive mixed model analyses were conducted. The first model focussed mainly on the effect of gender among lower-class speakers, with dependent variable log ratios (lower-class speakers only) and fixed factors preceding place of articulation (post-labial, non-post-labial), gender (female, male), time point (nucleus, midpoint, glide) and lexical set (CHOICE, NURSE). The analysis revealed, among other effects, a significant interaction between time point, gender and lexical set ($F[2, 356.3] = 3.9; p < 0.05$). A second model was therefore constructed for log ratios in the entire conversational dataset with fixed factors preceding place of articulation, social group (lower-class females, lower-class males, higher-class females), time point and lexical set. The results of the final model are listed in table 4.35.

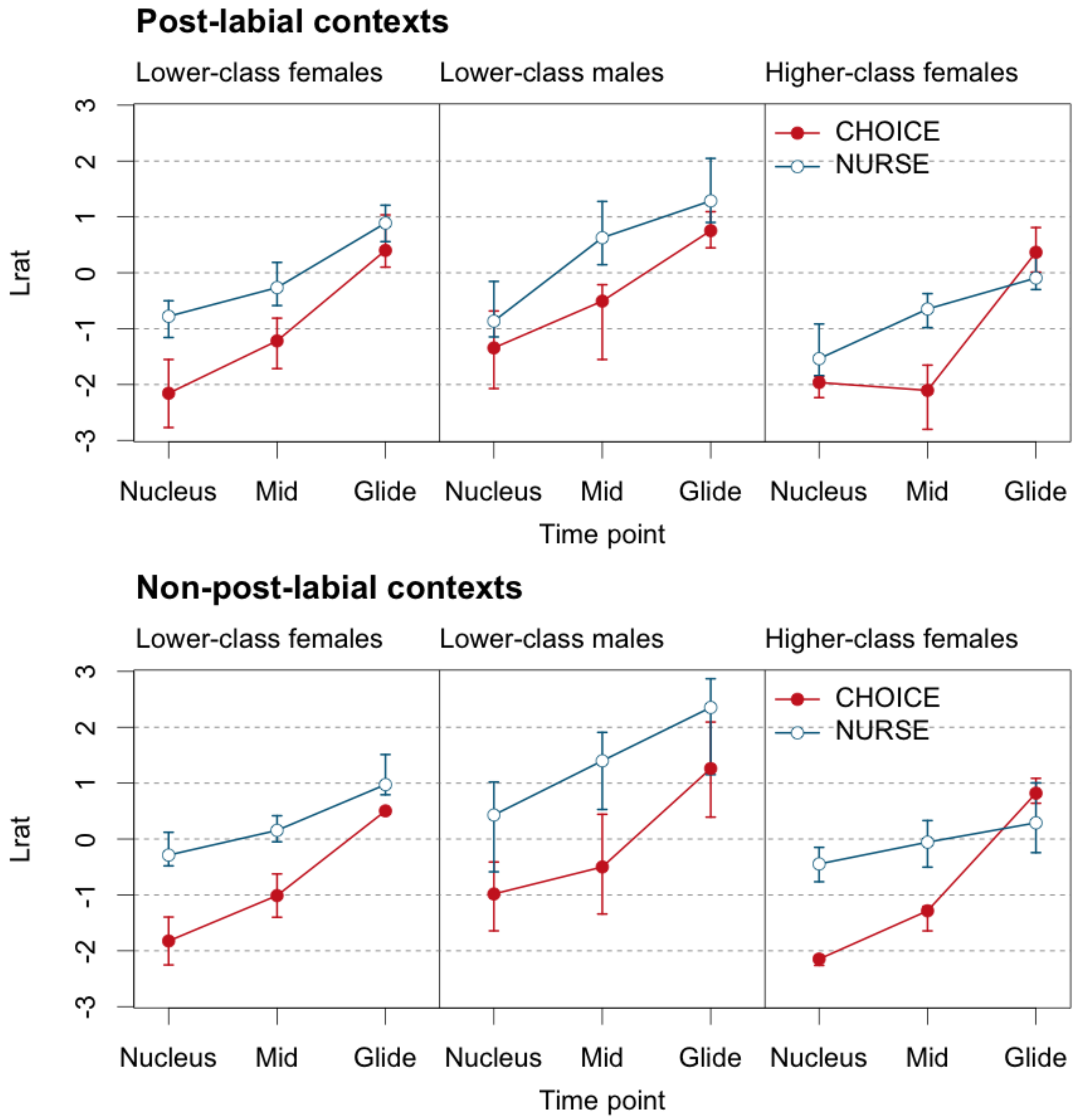

Figure 4.25: Log ratios (median and interquartile range) in the conversational data by preceding place of articulation, social group, time point and lexical set

The analysis revealed significant main effects of all fixed factors in the model, qualified, however, by a number of interactions including three three-way interactions, all of which involved the factor lexical set. Thus, the overall position of CHOICE and NURSE varied by social group, but the pattern was additionally confounded by the preceding place of articulation. Also, the similarity in terms of log ratios between CHOICE and NURSE varied for different time points, but this pattern was further modified by the effects of the preceding place of articulation on one hand, and by the effects of social group on the other.

As in the previous analysis of variation across speech styles, post-hoc testing focussed primarily on the contrast between the levels of lexical set, i.e. CHOICE and NURSE. Somewhat surprisingly, an analysis of simple main effects for lexical set revealed that the difference between CHOICE and NURSE in post-labial contexts was only significant in the midpoint of the vowels in the speech of lower-class males ($coef = -1.53; chisq = 18.9; p < 0.001$). Log ratios in especially CHOICE showed extensive variability both between and within speakers, which may have blurred any other systematic effects. In non-post-labial contexts, the difference between CHOICE and NURSE was significant for lower-class females in the nucleus ($coef = -1.96; chisq = 15.1; p < 0.01$), and for higher-class females in both nucleus ($coef = -1.87; chisq = 24.7; p < 0.001$) and midpoint ($coef = -1.67; chisq = 19.5; p < 0.001$). For lower-class males, NURSE and CHOICE were on average quite far apart in terms of their relative position between THOUGHT and FLEECE, but they also showed considerable variability and were, thus, not significantly distinct. A contrast-between-contrast analysis showed that, in post-labial context, higher-class females were the only social group for which the difference between CHOICE and NURSE with respect to the extent of spectral change from nucleus to glide was significant ($coef = -1.18; chisq = 17.2; p < 0.01$), that is the difference between nucleus and glide was larger in CHOICE than in NURSE. In non-post-labial contexts, the difference between nucleus and glide was significantly larger in CHOICE than in NURSE for both lower-class females ($coef = -1.68; chisq = 20.7; p < 0.001$) and higher-class females ($coef = -2.06; chisq = 43.7; p < 0.001$). Finally, the difference between CHOICE and NURSE regarding the extent of spectral change from nucleus to glide was significantly larger in the speech of higher-class females than in that of lower-class males in both post-labial and non-post-labial contexts ($coef = 1.23; chisq = 14.9; p < 0.01$).

Table 4.35: Mixed model analysis results: *Lrat* by preceding place of articulation (post-labial, non-post-labial), social group (lower-class females, lower-class males, higher-class females), time point (nucleus, midpoint, glide) and lexical set (CHOICE, NURSE)

Dependent variable **Significant factors**	**F**	**(df)**	**p-value**	
Lrat				
Place of art.	8.0	(1, 43.3)	< 0.01	**
Social group	17.5	(2, 11.5)	< 0.001	***
Lexical set	12.8	(1, 43.0)	< 0.001	***
Time point	141.9	(2, 21.8)	< 0.001	***
Place of art. : Time point	5.1	(2, 41.8)	< 0.05	*
Lexical set : Time point	32.2	(2, 36.9)	< 0.001	***
Social group : Time point	4.4	(4, 17.6)	< 0.05	*
Place of art. : Social group : Lexical set	4.5	(2, 344.3)	< 0.05	*
Place of art. : Lexical set : Time point	5.3	(2, 84.1)	< 0.01	**
Social group : Lexical set : Time point	7.1	(4, 631.8)	< 0.001	***

4.3.6.5 Social variation in the map task data

Figure 4.26 displays median log ratios and their interquartile ranges for the vowels in CHOICE and NURSE in the map task data at three time points through the vowel (nucleus, midpoint, glide), aggregated across social group (lower-class females, lower-class males, higher-class speakers) and preceding place of articulation. Log ratios in the map task data present a pattern of variation that resembles the one observed for log ratios in the conversational data, but the productions of male and female lower-class speakers appear to be more similar. Log ratios in NURSE tend to be higher than those in CHOICE, except in the glide in the speech of higher-class participants: For lower-class speakers of both genders, the vowel in NURSE glides to a position about as close to FLEECE as the vowel in CHOICE, while it remains fairly central, somewhat closer to THOUGHT than to FLEECE, for higher-class speakers. The place of articulation of the preceding consonant affects the NURSE vowel in all social groups, as the nucleus is consistently closer to THOUGHT in post-labial than in other contexts. Nuclei which are relatively close to THOUGHT in conjunction with extensive gliding movement towards FLEECE leads to clearly diphthongal tokens of post-labial NURSE in lower-class speech. In non-post-labial contexts, log ratios in NURSE in lower-class speech are higher than in higher-class speech. The extent of spectral change from nucleus to glide is much smaller in non-post-labial NURSE than in post-labial NURSE.

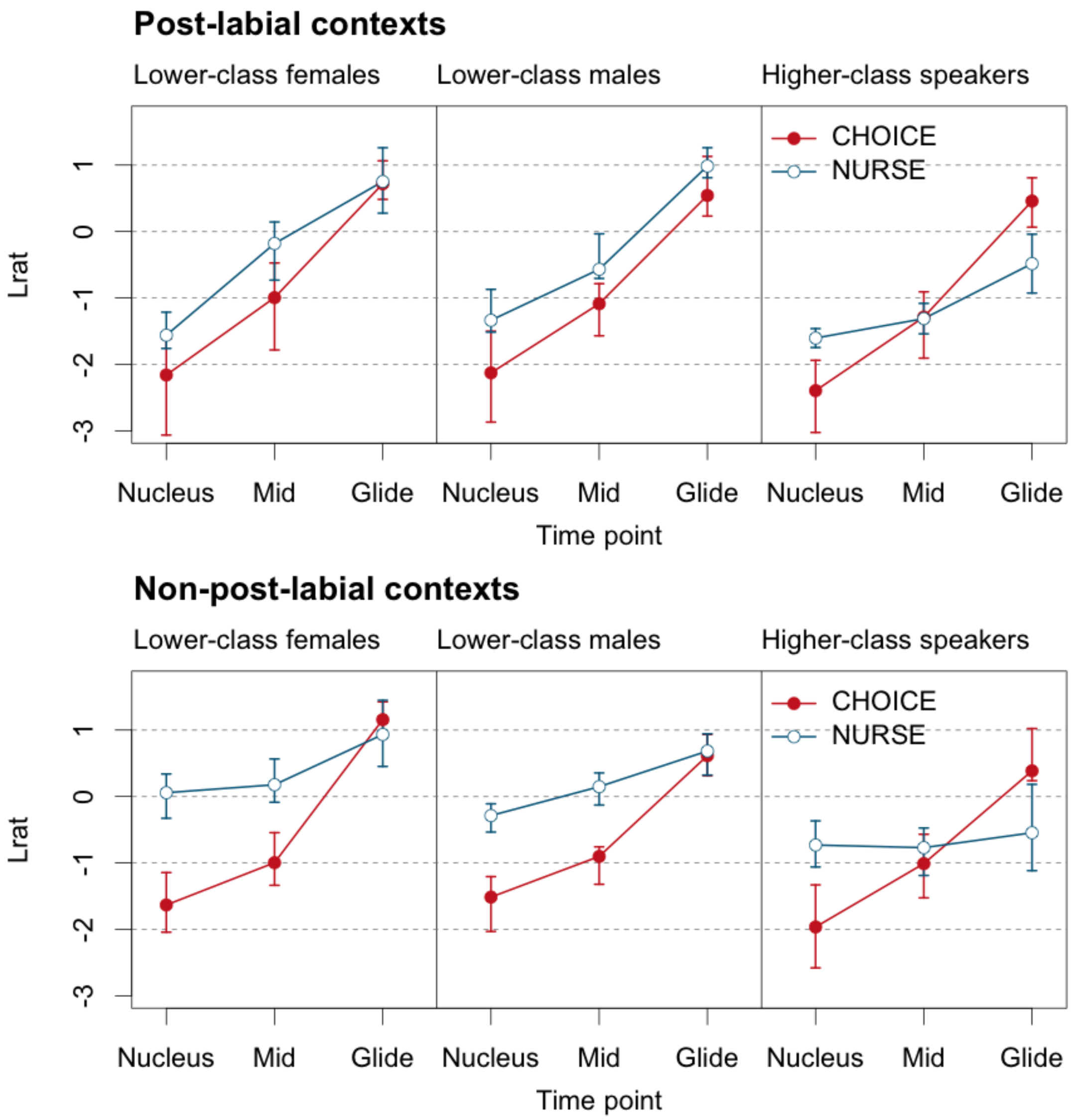

Figure 4.26: Log ratios (median and interquartile range) in the map task data by preceding place of articulation, social group, time point and lexical set

Two successive mixed model analyses were conducted. The first model focussed mainly on the effect of gender among lower-class speakers, with dependent variable log ratios (lower-class speakers only) and fixed factors preceding place of articulation (post-labial, non-post-labial), gender (female, male), time point (nucleus, midpoint, glide) and lexical set (CHOICE, NURSE). As the factor gender did not show to be significant, neither as a main effect nor as part of a significant interaction, the data for male and female lower-class speakers were combined and a second model was fit to all observations in the map task data with fixed factors preceding place of articulation, social class (lower-class, higher-class), time point and lexical set. The results of the final model are listed in table 4.36.

The analysis revealed significant main effects for all fixed factors except social class. These were qualified by a number of interactions including an interaction between place of articulation and time point, and a three-way interaction between social class, time point and lexical set. The preceding place of articulation, thus, had a significant effect on especially vowel onsets, but the effect was not significantly different for different lexical sets and/or social classes. The following findings of post-hoc tests therefore apply to vowels in both post-labial and non-post-labial contexts. An analysis of simple main effects for the factor lexical set showed that, for higher-class speakers, the glide in CHOICE was significantly closer to FLEECE than in NURSE ($coef = 0.95; chisq = 18.8; p < 0.001$). For lower-class speakers, the midpoint in NURSE was significantly closer to FLEECE than in CHOICE ($coef = -1.13; chisq = 31.8; p < 0.001$). For both higher- and lower-class speakers, the nucleus in CHOICE was significantly closer to THOUGHT than in NURSE (higher-class: $coef = -1.17; chisq = 24.6; p < 0.001$; lower-class: $coef = -1.42; chisq = 50.6; p < 0.001$). Moreover, a contrast-between-contrast analysis showed that the extent of spectral change from nucleus to glide was significantly larger in CHOICE than in NURSE for both social classes (higher-class: $coef = -2.11; chisq = 52.2; p < 0.001$; lower-class: $coef = -1.56; chisq = 48.7; p < 0.001$).

Table 4.36: Mixed model analysis results: *Lrat* by preceding place of articulation (post-labial, non-post-labial), social class (lower-class, higher-class), time point (nucleus, midpoint, glide) and lexical set (CHOICE, NURSE)

Dependent variable **Significant factors**	**F**	**(df)**	**p-value**	
Lrat				
Place of art.	5.5	$(1, 15.9)$	< 0.05	*
Time point	182.9	$(2, 18.8)$	< 0.001	***
Lexical set	22.1	$(1, 15.6)$	< 0.001	***
Place of art. : Time point	8.4	$(2, 13.6)$	< 0.01	**
Social class : Lexical set	21.4	$(1, 768.9)$	< 0.001	***
Time point : Lexical set	39.7	$(2, 20.1)$	< 0.001	***
Social class : Time point : Lexical set	3.2	$(2, 592.9)$	< 0.05	*

4.3.6.6 Social variation in the citation form data

Figure 4.27 displays median log ratios and their interquartile ranges for the vowels in CHOICE and NURSE in the citation form data at three time points through the vowel (nucleus, midpoint, glide), aggregated across social group (lower-class females, lower-class males, higher-class speakers) and preceding place of articulation. As there were hardly any non-rhotic tokens of NURSE available for higher-class speakers, higher-class tokens of NURSE had to be removed from analysis. In the citation form data, the difference between post-labial and non-post-labial contexts regarding the diphthongal quality of NURSE is smaller compared to what was found for the other two speech styles. However, log ratios in both nucleus and midpoint are still lower in post-labial contexts than in non-post-labial contexts. While in the previous analyses the glide in NURSE was found to be more central than that of CHOICE only for higher-class speakers, a relatively central offset of NURSE seems to be the norm in the citation form data for lower-class speakers.

A mixed-effects model analysis was conducted for log ratios in the speech of lower-class speakers only, with fixed factors preceding place of articulation, gender, time point and lexical set. The significant effects in the final model are listed in table 4.37. The effect of gender was not significant. While the main effect of place of articulation did not reach significance, the factor was involved in two significant interactions, indicating that its effect differed across time points as well as lexical sets. The spectral relation between CHOICE and NURSE differed for different time points.

An analysis of simple main effects was performed for the factors lexical set and time point (only contrasting the levels nucleus and glide); the significant results are listed in table 4.38. In both post-labial and non-post-labial contexts, nuclei and midpoints in CHOICE were significantly closer to THOUGHT than in NURSE, while glides in CHOICE were significantly closer to FLEECE. The difference between nucleus and glide in NURSE, however, was still significant, irrespective of the preceding place of articulation. A contrast-between-contrast analysis confirmed that CHOICE displayed significantly greater spectral change from nucleus to glide than NURSE ($coef = -2.25; chisq = 168.7; p < 0.001$).

Table 4.37: Mixed model analysis results: *Lrat* (lower-class speakers only) by preceding place of articulation (post-labial, non-post-labial), gender (female, male), time point (nucleus, midpoint, glide) and lexical set (CHOICE, NURSE)

Dependent variable **Significant factors**	**F**	**(df)**	**p-value**	
Lrat				
Time point	339.3	$(2, 11.1)$	< 0.001	***
Lexical set	32.8	$(1, 28.8)$	< 0.001	***
Place of art. : Time point	7.5	$(2, 36.7)$	< 0.01	**
Place of art. : Lexical set	8.1	$(1, 34.0)$	< 0.01	**
Time point : Lexical set	84.4	$(2, 48.6)$	< 0.001	***

Table 4.38: Post-hoc test results: Analysis of simple main effects for the factors lexical set and time point (contrasting levels nucleus and glide only)

Main effect: contrasted levels **Context of significant contrasts**	**Coef.**	**Chisq(df=1)**	**p-value**	
Lexical set: CHOICE – NURSE				
post-labial, nucleus	−1.24	29.4	< 0.001	***
post-labial, midpoint	−0.76	10.2	< 0.01	**
post-labial, glide	1.01	28.5	< 0.001	***
non-post-labial, nucleus	−1.88	100.9	< 0.001	***
non-post-labial, midpoint	−1.40	48.5	< 0.001	***
non-post-labial, glide	0.37	7.2	< 0.05	*
Time point: nucleus – glide				
post-labial, CHOICE	−3.91	464.6	< 0.001	***
post-labial, NURSE	−1.66	66.6	< 0.001	***
non-post-labial, CHOICE	−3.45	522.1	< 0.001	***
non-post-labial, NURSE	−1.20	46.9	< 0.001	***

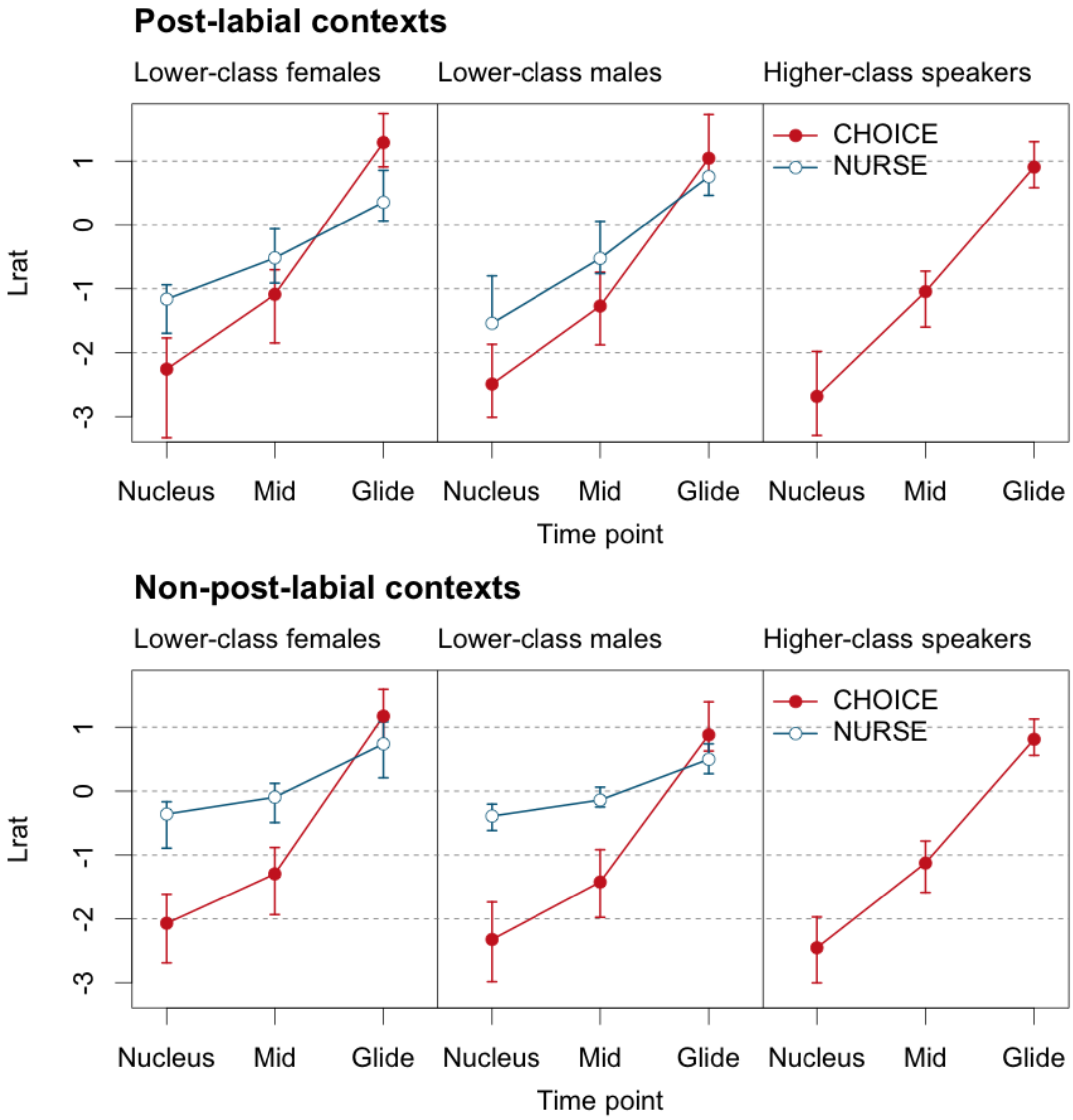

Figure 4.27: Log ratios (median and interquartile range) in the citation form data by preceding place of articulation, social group, time point and lexical set

4.3.7 Summary

In the preceding sections, the results of an acoustic analysis of the vowel in NURSE and of its relationship to the vowel in CHOICE in urban BahC were presented. Key findings are summarised below.

In general, categorical non-rhoticity was found for all speakers in the conversational data. Only one speaker, the higher-class speaker Mrs Smith, produced any rhotic tokens of NURSE at all (2 out of 14). More rhotic tokens were found in the map task data, especially among higher-class speakers, for whom rhotic pronunciation was clearly the norm. In the citation form data, r-full pronunciation of NURSE was nearly categorical for higher-class speakers, and it was also used variably by lower-class speakers. In both the map task and the citation form data, considerable variation conditioned by social class and gender could be found. Higher-class speakers of both genders were consistently more rhotic than lower-class speakers. Contrary to what has been observed for the American South, Bahamian females did not appear to take a lead in the change towards a more rhotic pronunciation. Female speakers of both higher and lower social classes tended to produce more non-rhotic tokens of NURSE than their male counterparts. The difference between the genders was especially great for lower-class speakers, where in map task speech females produced about 3% and males about 60% rhotic tokens. In this case, however, the pattern may have been compounded by the different ages of the participants, as female lower-class speakers were on average a generation older than male lower-class speakers.

Realisations of non-rhotic NURSE and CHOICE approximated each other in especially conversational speech, but the similarity of the two vowel categories was conditioned by the preceding consonantal context and, even in cases where NURSE was clearly diphthongal, spectral change in NURSE patterned differently across time than spectral change in CHOICE. The vowel onset of NURSE showed to be extremely malleable, ranging from a back to central position depending on the place of articulation of the preceding consonant. While vowel nuclei in both CHOICE and NURSE were closer to THOUGHT in post-labial than in non-post-labial contexts, the difference between the two contexts was much more salient for NURSE than for CHOICE. In post-labial contexts, the onset of NURSE tended to approach a fairly back position, while the offglide remained relatively front, causing an increase in overall spectral change. It was found that the extent of spectral change from nucleus to glide remained significantly greater in CHOICE than in NURSE, irrespective of speech style and preceding place of articulation. It was also found, however, that this difference was significantly smaller in the conversational and map task speech than in citation form speech.

Across speech styles, NURSE and CHOICE were most similar in post-labial contexts in the conversational data, where, in terms of the relative position of vowel nucleus, midpoint and glide between THOUGHT and FLEECE, NURSE and CHOICE only differed significantly in the midpoint. Based on visual assessment, the trajectory in CHOICE indicated a (first) steady-state at the beginning of the diphthong, followed by a sharp change in spectral quality towards a more front and high offglide. In NURSE, the trajectory did not indicate a steady-state at the beginning of the diphthong; rather, spectral change at the beginning of NURSE may be described as a somewhat elaborate onglide towards a relatively front and high target point. In the conversational data, post-labial CHOICE and NURSE had similar vowel onset qualities, but as spectral change in NURSE was initiated earlier than in CHOICE, the midpoint in NURSE was closer to FLEECE than in CHOICE. NURSE and CHOICE were least similar in non-post-labial contexts in the citation form data: Both nucleus and glide were consistently more central in NURSE than in CHOICE. Map task productions patterned in-between conversational and citation form productions. While the nucleus in map task NURSE was consistently more central than the nucleus in map task CHOICE, the position of glides was not significantly different.

Social variation regarding the approximation of NURSE and CHOICE was most salient in the conversational data, although in this speech style, the amount of between as well as within-speaker variability was also extensive. In general, CHOICE and NURSE were most similar in the speech of lower-class males, and least similar in the speech of higher-class females. In post-labial contexts, the difference between NURSE and CHOICE was only significant in the vowel midpoint for lower-class males. In non-post-labial contexts, females of both higher and lower social classes produced centralised nuclei in NURSE compared to CHOICE. In terms of overall spectral change from nucleus to glide, CHOICE was consistently more diphthongal than NURSE in the speech of higher-class females, irrespective of the place of articulation of the preceding consonant. In contrast, the difference between NURSE and CHOICE in terms of spectral change from nucleus to glide was not significant for lower-class males. For lower-class females, CHOICE was more diphthongal than NURSE in non-post-labial contexts, while the amount of spectral change in CHOICE and NURSE was equivalent in post-labial contexts.

Social variation in the map task data showed a similar trend than that observed in the conversational data, but the overall contrast between NURSE and CHOICE was generally greater and the effect of the preceding place of articulation did not differ significantly across lexical sets. For lower-class speakers, the effect of gender was not significant; for higher-class speakers, not enough non-rhotic tokens of NURSE were available to consider the difference between male and female speakers. For higher-class speakers, nuclei in CHOICE were closer to THOUGHT and glides in CHOICE were closer to FLEECE than in NURSE; that is, NURSE as a whole was more central than CHOICE. For lower-class speakers of both genders, nuclei and midpoints in NURSE were centralised compared to those in CHOICE, but glides in NURSE and CHOICE were similarly peripheral. The extent of gliding movement from nucleus to glide was greater in CHOICE than in NURSE for all social groups.

The analysis of social variation regarding the approximation of NURSE and CHOICE in the citation form data had to be restricted to lower-class speakers only, as higher-class speakers produced rates of rhotic tokens of NURSE close to 100%. The analysis showed that the difference between genders was negligible. The effect of the place of articulation of the preceding consonant was found to be more salient for the nucleus in NURSE than that in CHOICE; irrespective of the preceding context, however, nuclei and midpoints in CHOICE were significantly closer to THOUGHT that those in NURSE. In addition, glides in CHOICE were closer to FLEECE than glides in NURSE. The spectral change from nucleus to glide was greater in CHOICE than in NURSE. While the NURSE vowel in citation form speech may be adequately referred to as a mid central monophthong, it is still characterised by a significant amount of spectral change from nucleus to glide.

SIR, i.e. NURSE in word-final contexts, was extremely rare in the conversational and map task data. Based on auditory assessment, emphatic tokens of the pronoun *her* in conversational speech were consistently produced as monophthongs close to [ɐ]. The only stressed token of SIR produced in map task speech was rhotic, as were 67 out of 70 tokens of SIR in citation form speech. The three non-rhotic tokens of SIR were impressionistically fairly monophthongal, with a mid central vowel quality close to [ɜ]. Due to the scarcity of data regarding non-rhotic NURSE in word-final contexts, the question whether diphthongal variants may occur in these contexts in BahC cannot be answered conclusively; it is, however, unlikely.

Chapter 5

Monophthongs

This chapter is concerned with the spectral and temporal characteristics of nominal monophthongs in urban Bahamian speech, focussing on their overall distribution patterns and on the relative contribution of spectral and temporal dimensions in the distinction of vowels in vowel quality subsystems. Before the analysis procedure is outlined and the results are presented in sections 5.4 and 5.5, all lexical sets which were considered in this study are introduced below and information is provided on the proposed realisation of associated vowel categories in Bahamian and related varieties (section 5.1) and on prior research on spectral and temporal interactions in monophthongs (section 5.2).

All lexical sets included in the analysis are listed in table 5.1, which also gives some information on the definition and scope of each lexical set as well as on the vowel categories' Middle English (MidE) roots. Lexical sets are defined as groups of words which share the occurrence of certain vowel categories in stressed syllables, based originally on lexical incidence correspondences between Received Pronunciation (RP) and General American (GA) (cf. section 2.4.3.1). These vowel categories are listed in the second column of table 5.1, labelled 'Definition'. The table is divided into three sections based on the relative length, tenseness and phonotactic distribution characteristics generally attributed to the vowel categories associated with the lexical sets. The following brief descriptions of each lexical set are based on Wells (1982, 127-159).

Table 5.1: Definition and origin of lexical sets analysed as monophthongs in this study (cf. Wells, 1982, 127-159)

Lexical set	Definition	Trad. name	Origin	Example words
FLEECE	RP /iː/ GA /i/	long E	MidE /eː, ɛː/	meet, see, piece, meat, bead, tea
GOOSE	RP /uː/ GA /u/	(long oo), long U	MidE /oː, iu, ɛu/	loop, boost, do, duke, suit, new
THOUGHT	RP /ɔː/ GA /ɔ/	–	MidE /au, ɔu/	taught, bought, jaw, talk
START	RP /ɑː/ GA /ɑr/	–	MidE /ar/	far, bark, card
PALM	RP /ɑː/ GA /ɑ/	–	MidE /a, au/	calm, father, bra, Bach, spa, schwa
KIT	RP /ɪ/ GA /ɪ/	short I	MidE /i/	ship, kid, myth
DRESS	RP /e/ GA /ɛ/	short E	MidE /e, ɛː/	step, bed, theft, deaf, head
FOOT	RP /ʊ/ GA /ʊ/	(short oo)	MidE /u, oː/	put, bush, good, could
STRUT	RP /ʌ/ GA /ʌ/	short U	MidE /u, oː/	cup, snuff, bud, touch, blood
TRAP	RP /æ/ GA /æ/	short A	MidE /a/	tap, mad, dash
LOT	RP /ɒ/ GA /ɑ/	short O	MidE /ɔ, a/	stop, sock, rob watch, wasp
CLOTH	RP /ɒ/ GA /ɔ/	–	MidE /ɔ/	soft, moth, boss
BATH	RP /ɑː/ GA /æ/	–	MidE /a, au/	staff, path, fast, aunt, dance

FLEECE, GOOSE, THOUGHT, START, and PALM are described as relatively long and tense vowels that occur in both checked and free syllables. Wells' use of length marks for RP but not for GA vowels was not meant to reflect salient differences between the realisations of any particular vowel category, but to indicate that vowel length may play a more important role in RP than in GA. The vowel in FLEECE derives via the Great Vowel Shift (GVS) from MidE /eː/ and /ɛː/; the distinction between the reflexes was lost as a result of the 17th-century FLEECE merger. In most English accents today, the vowel is produced as a long, high, front monophthong, though some degree of diphthongisation of the [ɪi]-type is common, particularly in free syllables. GOOSE derives from MidE /oː/ via the GVS, or from MidE diphthongs /iu, ɛu/, which correspond to current /ju(ː)/. The traditional name 'long U' is reserved for reflexes of /iu, ɛu/, while reflexes of /oː/ are sometimes referred to as 'long oo'. 'Long U'-GOOSE today is characterised by variable YOD Dropping so that English accents vary in the absence or presence of a palatal glide preceding the vowel in words like *duke*, *suit* and *news*. For the present study, analysis of GOOSE was therefore confined to reflexes of /oː/ i.e. 'long oo'. While 'long oo'-GOOSE is generally produced as a long, high and relatively back monophthong, it is susceptible to fronting, for example in Australian English and in accents of the US south. In addition, similar to FLEECE, GOOSE may be characterised by some degree of diphthongisation. The vowel in THOUGHT has various origins, including MidE /au, ɔu/ before velar fricatives and word-final /au/. The lexical set only comprises those words in which the vowel is not followed by tautosyllabic /r/ in GA; these words are included in the lexical set NORTH. The quality of the THOUGHT vowel differs considerably between the two reference accents RP and GA as well as between English accents in general. In RP, THOUGHT is realised as a long, back, mid, closely-rounded monophthong. In GA, it tends to be lower and only weakly rounded. In some North American accents, THOUGHT has lost its roundedness completely, falling in with PALM and LOT. THOUGHT may also be diphthongised, with rising onglides or centring offglides. The vowel in START derives from MidE short /a/ in contexts where it was historically, and in GA still is, followed by tautosyllabic /r/. Due to 17th-century Pre-R Lengthening, subsequently followed by R Dropping in non-rhotic accents, it is today described as a long, low, unrounded monophthong. The most important phonetic variation in START concerns the degree of advancement: While it is relatively back in both RP and GA, centralised or fronted realisations are found in a number of accents, including in some Caribbean varieties. The lexical set PALM comprises only few common everyday words, as most of its members are recent borrowings from foreign languages. In cases where PALM occurs in native English words, it derives from MidE /a/ and /au/. Phonetically, PALM resembles START.

KIT, DRESS, FOOT, STRUT, and TRAP are described as relatively short and lax vowels that, in stressed contexts, occur only in checked syllables. KIT derives from MidE short /i/ and is in today's RP and GA produced as a short, lax, fairly front and fairly high, unrounded monophthong. Most English accents have similar realisations, but KIT may be closer to [i], i.e. higher and fronter, or it may be articulated more central than front. KIT is particularly susceptible to the development of allophones conditioned by the consonantal context. DRESS derives in most cases from MidE short /e/, though some instances have their origin in MidE /ɛː/ via a shortening process. In RP, it is described as a relatively short, lax, front, mid, unrounded monophthong; in GA, it is somewhat lower. While most accents are similar to RP and GA, DRESS is known to vary in the high-low dimension, and in a number of regional American English accents DRESS has developed closing or centring offglides. FOOT derives from MidE short /u/ and from MidE /oː/ via a shortening process. It is generally described as a short, lax, fairly back and fairly high, weakly rounded monophthong. Like KIT, FOOT varies across accents regarding the degree of peripheralisation; it also varies with respect to relative roundedness. The vowel in STRUT derives from the same MidE sources as FOOT. It is the result of the 17th-century FOOT-STRUT split, when MidE short /u/ in some words became unrounded and lowered. Today, STRUT is characterised by considerable variation across accents, but it is generally described as a relatively short, central or back monophthong. In those accents where it contrasts with FOOT, it is often mid or lower than mid and unrounded. TRAP derives from MidE short /a/ and is today described as a relatively short, front, relatively low, unrounded monophthong in RP and GA. Regional accents in the US tend towards a longer, higher, and perhaps tenser or diphthongal (centring) quality, while British accents maintain a short, lower, monophthongal quality. TRAP has relatively high, monophthongal variants in many southern-hemisphere accents; in most West Indian varieties, merger with nominally back vowel categories may lead to central or backed qualities in TRAP.

The lexical sets LOT, CLOTH and BATH are placed in a separate section in table 5.1, because their respective vowel length differs between the two reference accents. The vowel in LOT derives in most cases from MidE /ɔ/, but it also occurs in words which had MidE /a/ preceded by /w/. In today's RP, LOT is realised as a relatively short, back, relatively low, weakly rounded monophthong, which occurs only in checked syllables. In the US, rounded variants are restricted to certain areas such as eastern New England and parts of the coastal south. In GA, LOT is typically longer than in RP, central to back and unrounded; because of the PALM-LOT merger, the same vowel category also occurs in free syllables. The vowel in CLOTH is characterised by considerable variation. It derives historically from the same MidE vowel as LOT, /ɔ/, but in some contemporary accents reflects 17th-century Pre-Fricative Lengthening and is produced as a long, mid, back vowel.

Wells (1982, 136-137) refers to these accents as *broad-CLOTH accents*. GA is a broad-CLOTH accent and CLOTH is merged with THOUGHT. In RP and other *flat-CLOTH accents*, CLOTH retained or restored the historically short vowel and is usually merged with LOT. BATH, finally, derives, like TRAP, from MidE /a/. Its realisation in RP and in a number of other *broad-BATH accents* reflects the 18th-century TRAP-BATH split, which ultimately led BATH words to be pronounced with a long, backed vowel, close to or merged with PALM. In so-called *flat-BATH accents* such as GA, BATH originally remained short and corresponds to TRAP.

5.1 Nominal monophthongs in Bahamian varieties

Table 5.2 lists the vowel qualities of BahC as proposed by Wells (1982), Holm and Shilling (1982) (HS), and Childs and Wolfram (2004)(CW), comparing them to variants in a selection of associated varieties (Edwards, 2004; Blake, 2004; Devonish and Harry, 2004; Weldon, 2004; Youssef and James, 2004; Thomas and Bailey, 1998).

Table 5.2: Suggested vowel qualities in BahC and associated varieties.

	Bahamian Creole			Caribbean varieties			US varieties	
Lexical set	Wells	HS	CW	Bajan	TrinC	JamC	Gullah	AAVE
FLEECE	iː	iː	i	iː	iː	iː	i	ɪɪ
GOOSE	uː	uː	uː	uː	uː	uː	u	u
THOUGHT	ɑː ~ ɔː	ɔ	ɔ	ɑː ~ ɒː	ɒ ~ ɔ(ː)	aː ~ ɔː	ɒ ~ ɔ	ɔʊ
START	aː	aː	ɑː	aː	a(ː)	aː	a	ɑː
PALM	aː ~ ɑː	aː	ɑ	aː	a(ː)	aː	a ~ æ̞	æ
KIT	ɪ	ɪ	ɪ	ɪ	i(ː) ~ ɪ	i ~ ɪ	ɨ ~ ɪ̞	iɪ
DRESS	ɛ	ɛ	ɛ	ɛ	ɛ	ɛ	ɛ ~ ɛ̞	ɛɪ
FOOT	ʊ	ʊ	ʊ	ʊ	ʊ	u ~ ʊ	ʊ	ʊ
STRUT	ʌ	ɔ ~ ʌ	ɔ ~ ʌ	ʌ	ɒ ~ ɔ(ː) ~ ʌ	ɵ ~ o	ʌ	ʌ
TRAP	a	æ	a ~ æ	a	a ~ æ	a ~ ɐ	a ~ æ̞	æɛ
LOT	ɑ ~ ɔ	ɔ	ɑ	ɑ ~ ɒ	ɒ ~ ʌ ~ ɔ	a ~ ɔ	ɒ ~ ɑ	ɑ
CLOTH	ɑː ~ ɔː	–	ɔ	ɒː	ɔ(ː)	aː ~ ɔː	o	ɑ
BATH	aː	aː ~ æ	a ~ æ	aː	a(ː)	aː	a ~ æ̞	æɛ

In Caribbean vowel systems, vowel length plays a prominent role in distinguishing potential long/short vowel pairs such as FLEECE/KIT, GOOSE/FOOT and START/TRAP, while American varieties Gullah and AAVE contrast these vowels primarily on the basis of vowel quality. For the Jamaican context, it has been argued that the basilectal system utilises primarily length distinctions for both high and low long/short vowel pairs, while the acrolectal system distinguishes non-low vowel pairs also with respect to relative height, peripheralisation, or tenseness (Devonish and Harry, 2004, 453, 461). To some extent, the varying roles that quantity and quality distinctions may play in different vowel quality subsystems is also reflected in the less radical, intermediate creole Bajan: FLEECE/KIT and GOOSE/FOOT are distinguished in terms of both vowel quantity and quality, whereas the distinctions between START/TRAP and THOUGHT/LOT depend primarily on quantity. In TrinC, vowel length is extremely variable and no definite claims can be made except that the contrast between GOOSE and FOOT relies on both vowel quantity and quality distinctions. Vowel length plays a role in all proposed Bahamian vowel systems, but it appears to be more prominent in the descriptions provided by Wells and HS. According to Wells, BahC vowels behave similarly to those of acrolectal JamC or Bajan. FLEECE/KIT and GOOSE/FOOT are distinguished in terms of both quantity and quality, while START/TRAP and THOUGHT/LOT rely primarily on vowel quantity distinctions only. HS propose that both vowel length and quality contrasts are utilised in all subsystems. CW single out GOOSE and START as the only phonemically long vowels. GOOSE, thus, contrasts with FOOT in both quality and quantity, while the distinction between FLEECE and KIT is attributed primarily to a difference in quality. START is described as qualitatively different from TRAP, which is unusual for Caribbean varieties. Instead, CW suggest that START is produced as a long, low, back, unrounded vowel, contrasting with LOT only in vowel length.

In terms of vowel quality, there is little difference in FLEECE, GOOSE, KIT, FOOT and DRESS across the different varieties and the proposed vowel qualities of BahC. FLEECE and GOOSE are described as high, front, unrounded and high, back, rounded monophthongs, respectively. KIT and FOOT occupy more central positions than their tense counterparts. For TrinC and JamC it is noted that KIT may approach FLEECE in quality. For Gullah, conversely, Weldon (2004) argues that KIT is produced as a fairly lowered and/or centralised version of /ɪ/, approaching the position of [ɛ] (395-396). DRESS is transcribed by all authors and for all varieties as /ɛ/, though it may be lowered in Gullah, possibly in response to lowered /ɪ/. The short vowel in STRUT is characteristically backed and may be rounded in Caribbean varieties. While it may overlap with THOUGHT or LOT, it is usually retained as a separate vowel category. HS and CW describe the STRUT vowel in BahC as varying between a more backed, rounded and a more central, unrounded quality. Wells transcribes the STRUT vowel phonemically as /ʌ/ but notes that its phonetic realisation is extremely back.

The lexical sets THOUGHT, START, TRAP, LOT, CLOTH, PALM and BATH display a considerable degree of variability across the different varieties. THOUGHT, START and TRAP, however, provide convenient anchor points for the description of variation in vowel quality, against which the remaining lexical sets can then be compared (see table 5.3). In basilectal JamC, the distinction between mid-low and low front and back vowels is lost so that THOUGHT merges with START and TRAP merges with LOT; they are produced as long and short, low, relatively central, unrounded monophthongs, respectively. In more acrolectal forms of JamC, THOUGHT and LOT are backed, rounded and raised to approximately mid-height. This general pattern is also found in many other Caribbean varieties. While THOUGHT is never merged with START in Bajan and TrinC, it is typically either unrounded or low, and it is only rounded or raised in acrolectal speech forms. START and TRAP are produced as low, relatively central, unrounded monophthongs and differ primarily in vowel quantity. In Gullah, the relation between THOUGHT, START and TRAP is similar to the situation in Bajan and TrinC. However, vowel quality may play a more important role in distinguishing START and TRAP, as the latter may be fronted, presumably reflecting the influence of non-creolised US varieties. In AAVE, THOUGHT is typically mid-high, back, rounded, and possibly diphthongised. It is clearly distinct from low, back, unrounded START, which, in turn, differs from the relatively low, front, and possibly diphthongised vowel in TRAP in terms of both quality and quantity. As for BahC, Wells essentially describes THOUGHT, START and TRAP as following the same pattern as in the intermediate Caribbean creoles Bajan and TrinC: THOUGHT is a low to mid, possibly rounded back vowel, qualitatively distinct from START, while START and TRAP occupy a low, relatively central position and are distinguished primarily by vowel length. HS describe THOUGHT, START and TRAP as representing three qualitatively different vowel categories, /ɔ/, /aː/ and /æ/, but they note that TRAP is actually more central than may be inferred from the phonetic symbol and transcribe the vowel elsewhere as /a/. CW also propose three qualitatively distinct vowel categories for THOUGHT, START and TRAP, with THOUGHT invariably mid-high, back and rounded, START invariably long, low, back and unrounded, and TRAP low, relatively central or front (and unrounded). This last pattern strongly resembles the distribution of the vowels in AAVE and other non-creolised American varieties of English.

The remaining lexical sets LOT, CLOTH, PALM and BATH are described in table 5.3 in terms of proposed correspondences with the lexical sets THOUGHT, START and TRAP. The vowel in LOT is equivalent to a short version of THOUGHT in most Caribbean varieties, but to a short version of START in AAVE. LOT in Gullah is somewhere in-between – it may be equivalent to THOUGHT, but it may also be somewhat lower. For LOT in BahC, three different realisations have been proposed: Wells describes BahC LOT as a short version of THOUGHT like in other Caribbean varieties, HS describe LOT as identical to THOUGHT, also in length, and CW suggest that LOT is equivalent to short START like in AAVE and many other US accents. Most Caribbean accents are broad-CLOTH accents in Wells' terminology, as CLOTH tends to pattern with the long vowel in THOUGHT. In contrast, AAVE realises CLOTH as a short version of START, the same as LOT, and might be referred to as a flat-CLOTH accent. Gullah generally produces CLOTH as THOUGHT, though it may be slightly higher and more closely rounded. For BahC, Wells proposes that CLOTH is equivalent to a short version of THOUGHT, the same as LOT, which would presumably make BahC a flat-CLOTH accent. However, CW identify the vowel in CLOTH as identical to THOUGHT. The vowel in PALM is generally produced as a long, low, unrounded monophthong in most Caribbean varieties, equivalent to START. In Gullah and AAVE, it is usually shorter and fronter than START, similar in quality to TRAP. BahC PALM is uniformly described as identical or similar in quality to START, but CW suggest that it may be shorter. The vowel in BATH also differs between Caribbean and US varieties. Caribbean varieties tend to be broad-BATH accents, with BATH identical to START, while Gullah and AAVE are flat-BATH accents and BATH patterns with TRAP. For BahC, all possible versions have been proposed. Wells describes BATH as identical to START, CW propose that BATH is equivalent to TRAP, and HS suggest that BATH may be variably both.

Table 5.3: Correspondences among lexical sets.

Variety	**LOT**	**CLOTH**	**PALM**	**BATH**
Caribbean	short THOUGHT	THOUGHT	START	START
BahC (Wells)	short THOUGHT	short THOUGHT	(START)	START
BahC (HS)	THOUGHT	–	START	START/TRAP
BahC (CW)	short START	THOUGHT	short START	TRAP
Gullah	(THOUGHT)	(THOUGHT)	TRAP	TRAP
AAVE	short START	short START	(TRAP)	TRAP

5.2 Spectral and temporal interactions

5.2.1 Variation in vowel duration

It has been long established that English vowels vary in their duration in systematic ways. Phonetic factors that may affect vowel length include characteristics intrinsic to the vowels themselves as well as characteristics pertaining to their phonetic environment. For example, vowels produced with an open jaw position tend to be longer than those produced with a close jaw position. In terms of flanking segments, it is in particular the voicing status of the following consonant that has a considerable influence on vowel length, with vowels in pre-voiced contexts being longer than those in pre-voiceless contexts. In connected speech, the duration of vowels may be further moderated by factors related to lexical structure and sentence prosody such as lexical stress, semantic emphasis, and phrase-final lengthening (e.g. Lehiste, 1970; Klatt, 1976). These phonetic effects are universal, principally unrelated to language-specific phonological contrasts, but they do not necessarily operate uniformly across all languages or language varieties. Zimmerman and Sapon (1958), for example, examined vowel duration in English and Spanish and found that the effect of the voicing status of the following consonant in the two languages was "qualitatively similar but quantitatively different" (152). On average, the duration ratio of pre-voiced to pre-voiceless vowels was 1.57 in English but only 1.17 in Spanish.

While vowel duration has been studied extensively in phonetics and speech science, it has not received as much attention in sociolinguistics and dialectology, where even the most encyclopaedic research has focussed primarily on (spectral) vowel quality (see e.g. Labov et al., 2006, 36). As Jacewicz et al. (2007) noted, "[g]iven the massive body of research on regional and social variation in American English vowels, it is surprising to find a large gap in research on an issue as basic as durational differences" (367). More recently, interest in vowel duration has been revitalised and a few studies have documented systematic sociolinguistic variation in vowel duration in North American varieties of English. Vowels in the Southern regions of the United States were found to be significantly longer than vowels in the North, Midland, or West (Jacewicz et al., 2007; Fridland et al., 2014). Sociophonetic variation in vowel duration was also reported for the effects of ethnicity and gender. When controlled for regional origin, Holt et al. (2015) found that AAVE speakers tended to produce longer vowels than white speakers. In addition, the temporal tense/lax contrast was somewhat minimised for AAVE speakers, though not completely neutralised. On average, vowels produced by women of both ethnicities were significantly longer than those produced by men, a finding that has also been documented for a number of other varieties (e.g. Hillenbrand et al., 1995; Jacewicz et al., 2007).

5.2.2 Spectral and temporal contributions to phonemic distinctions

Fridland et al. (2014) tested the link between regional differences in vowel duration and patterns of vowel shift and found that the interplay of vowel quality and quantity in marking distinct vowel categories may differ across dialect regions. They suggested that the observed positive correlation between spectral overlap and vowel duration in the speech of Northern and Western speakers indicates that, in these varieties, durational distinction is used to maintain contrast in cases of spectral merger. A different pattern, however, was found for /e, ɛ/ and /i, ɪ/ in contemporary Southern speech. Lax vowels in the South were significantly longer than those in the other dialects – the typical length relationship of tense and lax vowels was even reversed for some speakers – and individual speakers with increased tense/lax spectral overlap actually showed less durational contrast. Fridland et al. argued that disambiguation of these vowel pairs in the South may be typically achieved by spectral change across time, ingliding in lax vowels and upgliding in tense vowels, a notion supported by preliminary work by Fox and Jacewicz (2009).

Across languages, a good deal of research has been devoted to the typological analysis of vowel systems and their classification as primary length- versus primary quality-contrasting. The designation *primary quality* is used for languages in which spectral contrasts, typically carried in the first two formants, provide the primary basis for phonological contrasts in neighbouring vowel categories. The terms *primary quantity* and *secondary quantity* are used for languages in which vowel length plays a crucial role. The former refers to languages in which phonological contrasts rely primarily on temporal distinctions, while the latter indicates that robust differences in spectral vowel quality are systematically accompanied by differences in vowel length (e.g. Wassink, 2006). Notwithstanding the obvious truth that languages and language varieties may differ in the relation between spectral and temporal cues to phonological contrasts, the classification of varieties into these three broad categories needs to be based on a clear and unambiguous auditory or acoustic linguistic rationale, which so far remains elusive or is achieved by somewhat arbitrary means.

Table 5.4 lists a selection of languages which have been reported to utilise vowel length distinctions (see Crother, 1978; Wassink, 2006). Durational differences between phonologically long and short vowel pairs are traditionally expressed in long-to-short ratios, which are here accompanied by impressionistic judgments of the amount of spectral overlap (full, partial or no overlap) and the associated categorisation as primary or secondary quantity according to Crother (1978). Japanese, Thai, Icelandic and Luganda are considered unambiguous examples of primary quantity languages, displaying very high long-to-short duration ratios. By convention, a duration ratio of 1.6:1 is arbitrarily defined as the lower margin for languages with primary-quantity distinctions. English, with an average duration ratio of 1.2:1, is typically described as a language utilising secondary quantity, and differences in vowel length between vowels in tense/lax relationships are said to enhance rather than constitute phonological distinctions.

Table 5.4: Proposed classification of languages utilising vowel length (Crother, 1978; also see Wassink, 2006, 2336)

Language	Duration ratio	Spectral overlap	Classification
Japanese	2.5:1	Full	Primary quantity
Thai	1.9:1	Full	Primary quantity
Icelandic	2.0:1	Partial	Primary quantity
Luganda	2.5:1	Partial	Primary quantity
German	1.5:1	Partial	Secondary quantity
English	1.2:1	Partial	Secondary quantity

There are, however, several problems with this rather simplistic view of the issue.

Firstly, as already mentioned above, the relationship between spectral and temporal characteristics of English vowels may differ across regionally, socially and ethnically defined varieties. Table 5.5 lists the average vowel durations of /i/ and /ɪ/ reported for speakers of two distinct regional varieties in the United States, further divided by gender and, if applicable, ethnic group. Measurements for the Midwestern speakers are taken from Hillenbrand et al. (1995, 3103), those for the Southern speakers are taken from Holt et al. (2015, 465, adults aged 18-49). All measurements are based on word list data, where vowels occurred in /h/V/d/ contexts. Corresponding duration ratios, listed in column six, show that the temporal relation between tense /i/ and lax /ɪ/ varies from 1.29:1 for female, Midwestern speakers to 1.06:1 for black, female, Southern speakers. If AAVE in the American South indeed displays duration ratios close to 1.0:1, it is doubtful whether the categorisation of this variety as employing secondary quantity contrasts is truly warranted; this, in turn, qualifies to some extent the claim that the English language as a whole can be clearly defined as employing secondary quantity.

Table 5.5: Duration [ms] for /i/ and /ɪ/ and corresponding tense/lax duration ratios in different regionally, ethnically, and socially defined varieties of American English (cf. Hillenbrand et al., 1995; Holt et al., 2015)

Region	Ethnicity	Gender	Duration /i/	Duration /ɪ/	Ratio
Midwest	(White?)	Female	306	237	1.29
		Male	243	192	1.27
South	White	Female	284	242	1.17
		Male	244	215	1.13
	Black	Female	348	327	1.06
		Male	334	303	1.10

Secondly, determining the phonological status of vowel length in a given variety may be problematic due to the interaction of phonetic-universal and language-specific effects on vowel duration. In particular, difficulties arise when the phonetic realisation of phonological length is confounded with processes of phonetic lengthening unrelated to phonological contrasts. For example, Lehiste (1970) reported that the average duration ratio of (standard American) English tense/lax vowel pairs is 1.2:1, which is a language-specific characteristics of vowel length. She also noted, however, that the ratio may increase to about 1.5:1 if only vowels preceding voiced obstruents are considered, a phonetic tendency related to the lengthening of vowels before voiced relative to voiceless segments. In addition, references to the phonemic or sub-phonemic nature of vowel length contrasts are often made without in-depth analysis of the type and degree of spectral distinctions that (potentially) obtain simultaneously to temporal distinctions. While positioning language varieties on a scale from primary quantity to secondary quantity and primary quality does depend on the extent of temporal contrast observed in tense/lax or long/short vowel pairs, it is just as important to provide a detailed description of spectral characteristics and of interaction patterns between vowel length and vowel quality; only the joint analysis of temporal and spectral characteristics may uncover the relative contribution of vowel quantity and vowel quality to phonemic distinctions.

Finally, the application of such all-encompassing labels as primary quantity implies that temporal and spectral relationships within individual vowel systems are relatively uniform. However, as Wassink (2006) pointed out, "[w]hile it may be convenient to be able to accord classifications such as primary quantity or primary quality on the basis of the overall system, it cannot be expected that all pairs exist in the same phonetic relationships" (2239). It is, thus, necessary to examine whether a given parameter may be more important to contrast for one particular opposition than for another.

5.2.3 Spectral and temporal overlap in Jamaican varieties

Linguists inquiring into the phonology of Jamaican Creole (JamC) have often argued that the distinction between long/short vowel pairs in basilectal varieties is based mainly on differences in vowel length, while long/short distinctions in mesolectal and acrolectal varieties may additionally show vowel quality contrasts, especially in non-low vowel pairs. Devonish and Harry (2004), for instance, posited that three of five simple vowels in the basilectal vowel system, /i/, /a/ and /u/, combine with themselves to form complex, double vowel phonemes /ii/, /aa/ and /uu/. They argued that "[t]he relationship between the simple vowels and their longer equivalents is primarily one of length rather than that of height or tenseness" (453). In the vowel system of acrolectal JamC, Devonish and Harry (2004) argued that all six simple vowels, /i/, /e/, /a/, /ɔ/, /o/ and /u/, combine to form long or double vowel phonemes. Much more so than in basilectal JamC, however, non-low long/short vowel pairs are described to differ not just in vowel length but also in vowel quality: "long non-low vowels are always higher and tenser than their short equivalents" (461). In the low vowels /a/ and /aa/, the phonemic contrast relies primarily on vowel length. While, phonetically, the contribution of vowel length may vary as a function of vowel quality subsystem, Devonish and Harry (2004) argued that, from a phonological perspective, it may be more economical to "single out length as the primary distinction [...], with relative height and tenseness being secondary, predictable features of the distinction in the case of the non-low vowels" (461).

In a series of studies on the vowel system(s) of basilect-dominant and acrolect-dominant speakers of JamC, Wassink (1999a, 2001, 2006) sought to illuminate the nature and relative role of vowel quantity and quality differences in phonemic tense/lax contrasts in different varieties on the Jamaican creole continuum. The data used were the same for all three studies, which differed only in the analysis approach. Vowel tokens representing the phonemic categories /iː, i, aː, a, uː, u/ were elicited in monosyllabic target words in /b, d, k/V/p, b, t, d, k, ɡ, s, z, n/ contexts. The target words, in turn, were embedded in Creole or English carrier phrases. Tense/lax vowel pairs /iː, i/ and /uː, u/ correspond to the lexical sets FLEECE/KIT and GOOSE/FOOT, respectively; /aː, a/, in Wassink's analysis, represent the lexical sets THOUGHT/TRAP. In basilectal varieties of JamC, THOUGHT/START and LOT/TRAP are merged, while they have distinct vowel qualities in acrolectal speech. This is important to note, because, as outlined above, Devonish and Harry (2004) argued that the distinction between /aa/ and /a/ relies primarily on vowel length in both basilectal and acrolectal varieties. Crucially, however, for the description of the acrolect, Devonish and Harry (2004) used these symbols to refer only to the lexical sets START/PALM/TRAP, while THOUGHT/LOT were represented as /ɔɔ, ɔ/.

In her earlier studies, Wassink (1999a, 2001) quantified the amount of temporal overlap the traditional way, with the help of long-to-short duration ratios: Ratios smaller than 1.2:1 were defined as complete temporal overlap, ratios greater than 1.6:1 were defined as no temporal overlap and those in-between were considered indicating partial temporal overlap. Spectral overlap was estimated using a metric based on ellipse geometry. For each pair of contrasted vowel distributions, ellipses in F1×F2 space were fitted to the data points, where principal radii were defined as twice the distributions' standard deviation. Overlap was then gauged by the maximum extent the radius of either distribution protruded into the ellipse area describing the other: Complete spectral overlap occurred when the radius of either ellipse protruded into the area of the other by "more than a moderate amount" (Wassink, 2001, 140), moderate being defined as 40%; no spectral overlap occurred when the two ellipses did not intersect; protrusion of the radius of one ellipse into the other by less than 40% was defined as partial spectral overlap. Wassink found that basilectal speakers showed instances of no spectral overlap only for the high front vowel pair /iː, i/, while acrolectal speakers showed instances of complete spectral overlap only for the high back vowel pair /uː, u/. Spectral overlap was generally greater for basilectal than for acrolectal speakers. The temporal contrast between the three vowel pairs was relatively high. The duration ratios for basilectal speakers tended to be slightly higher than those for acrolectal speaker, though all ratios approached or exceeded the lower margin for primary quantity languages of 1.6:1. The temporal contrast between /uː, u/ was especially high, yielding in both speaker groups a duration ratio of 2.27:1, presumably compensating for the high amount of spectral overlap (Wassink, 2001, 149). Wassink concluded that both basilectal and acrolectal JamC speakers "utilize duration contrasts to an extent similar to speakers of languages with phonemic vowel length" (151) and that "duration possibly pays a greater role relative to spectral distinctions than in varieties of English such as American" (151). In addition, basilectal speakers, showing smaller spectral differences, may depend more on temporal contrasts than acrolectal speakers.

In 2006, Wassink argued for a multidimensional mathematical procedure which would allow simultaneous representation and quantification of spectral and temporal cues to phonological contrasts, facilitating the cross-linguistic and cross-varietal comparison of the interaction of vowel quality and vowel quantity. She proposed an ellipsoid-based geometrical method, referred to as the spectral overlap assessment metric (SOAM), which may be applied to an investigation of spectral (F1, F2) as well as spectral and temporal relations (F1, F2, duration). The method is explained in detail in Wassink (2006, 2346-2349) and relies, like her earlier method for estimating the amount of spectral overlap, on the fitting of two-standard-deviation ellipsoids to all data points in a given vowel's distribution. In this approach, vowel distributions are not only modelled as ellipsoids in two-dimensional F1$\times$F2 space, but also in three dimensions F1$\times$F2$\times$Duration. The difference in overlap between two vowels' distributions in two and three dimensions may then be used to describe the relative contribution of temporal contrasts in the distinction of the two vowel categories, given the amount of spectral overlap. The overlap of two ellipsoids is quantified by a “somewhat ‘brute-force’ method” (2348), which involves dividing the ellipsoid space into a grid of test points and calculating for each test point whether or not it falls within either of the two ellipsoids. Test points which occupy space in both ellipsoids are then used to estimate the overlap area (2D) or volume (3D). Since the two ellipsoids may be of different areas/volumes, the smaller one is chosen to calculate the overlap percentage. The data for basilectal and acrolectal JamC used in this study was the same as for Wassink’s previous studies, except that consonantal contexts were restricted to plosives /b, d, k/V/p, b, t, d, k, g/. In addition, comparable data for a third variety was included in the study, a sample of Pacific Northwest American English. The study results are summarised in table 5.6.

Table 5.6: Mean duration ratios in basilectal and acrolectal JamC for three tense/lax vowel pairs (cf. Wassink, 2001, 149)

	Overlap in /iː, i/		Overlap in /uː, u/		Overlap in /aː, a/	
Variety	2D	3D	2D	3D	2D	3D
JamC (basilect)	75%	17%	86%	47%	55%	23%
JamE (acrolect)	36%	9%	75%	18%	23%	2%
AmE	46%	27%	34%	14%	15%	0%

Based on the comparison of the overlap fractions in two and three dimensions, Wassink (2006, 2340-2343) concluded that duration is most critical for phonemic contrasts in basilectal JamC, where the inclusion of the parameter of duration has the most notable reducing effect on overlap. For AmE, overlap also decreases in three relative to two dimensions, but less substantially, enhancing robust contrasts that already exist in F1 and F2 dimensions. The most complex spectral and temporal relations apparently hold for JamE, or acrolectal JamC, where duration plays a prominent role in contrasting high back vowels but seems to only enhance spectral contrasts in high front and low central vowels.

5.3 Research questions and hypotheses

In light of the great variability in the accounts of Bahamian vowels, the first aim of the present study must be to provide a basic description of monophthongal vowel categories.

1. How can the overall spectral distribution pattern of monophthongs in urban BahC be described? What are the approximate positions of vowels in the individual lexical sets in F1×F2 space?
2. What are the temporal relations of monophthongs in the BahC vowel system as a whole?
3. Vowels in conversational speech can be expected to be somewhat centralised and shortened relative to vowel in citation form. Can other general style-based differences or tendencies in the spectral and temporal characteristics of BahC monophthongs be observed?

In a second step, focus will shift to a more thorough investigation of two groups of lexical sets, separately for each speech style.

1. What are the spectral and temporal characteristics of the vowels in TRAP, BATH, START and PALM?
2. What are the spectral and temporal characteristics of the vowels in LOT, CLOTH and THOUGHT?
3. Do the observed spectral and temporal characteristics differ across gender and/or social class?

Lastly, the amount of spectral and temporal overlap in tense/lax vowel pairs will be analysed for two selected speakers groups, which represent the most basilectal and the most acrolectal speech forms in the data for this study.

1. What are the relative contributions of spectral and temporal contrasts to phonemic distinctions? If BahC is similar to JamC, temporal contrasts may be expected to play a prominent role. If BahC is similar to AAVE or other American English varieties, temporal contrasts will be less prominent.

2. Do these temporal and spectral relations differ in more basilectal compared to more acrolectal speech? If BahC is similar to JamC, temporal contrasts will more prominent in basilectal than in acrolectal speech.

3. Do these temporal and spectral relations differ for different tense/lax vowel pairs and following voicing contexts?

5.4 Analysis procedure

All acoustic analyses were restricted to vowels in maximally bisyllabic words. Vowels in monosyllabic words were used for spectral as well as temporal analyses, while vowels in bisyllabic words were restricted to spectral analyses. Vowels in citation form were elicited in CVC contexts. With only few exceptions, all vowels were preceded by /b, p, f, h/ and followed by /d, t, s, z/; /t/ in potential t-flapping contexts was avoided. Vowels were followed by non-coronal consonants only in the words *book* (n=34 tokens) and *talk* (n=33 tokens), which were restricted to analyses of vowel duration. For a full list of elicited words, see table 3.4 on page 97. For the conversational data, vowels in word-final position were retained if directly followed by a voiced consonant and treated as pre-voiced. Pre-nasal and pre-liquid contexts were avoided as well as tokens following /r/ or semivowels. Vowels followed by /t/ in potential t-flapping contexts were removed from the dataset. After close inspection of the data, it was found that the vowel in *good* (n=26 tokens in the conversational data and n=32 tokens in the citation form data) was considerably fronted compared to other words in the FOOT lexical set, and it was subsequently restricted to analyses of vowel duration.

For the lexical sets TRAP and BATH, vowels in potential KYA positions i.e. following velar consonants were excluded from the analysis. Rhotic pronunciation of START was completely absent from the conversational data, but not from the citation form data, where 182 of a total of 316 vowel tokens were followed by /r/ by auditory assessment. The distribution of r-full START will be examined across social variables gender and social class, but /a(ː)r/ tokens will not be analysed acoustically. For FACE, and GOAT, only pre-voiced tokens were considered, which showed to be monophthongal (see section 4.1). A total of 4671 tokens were finally subjected to acoustic analysis, 2179 from the conversational and 2492 from the citation form dataset. Table 5.7 lists the total number of vowel tokens in mono- and bisyllabic words for each lexical set, following voicing context and speech style.

Table 5.7: Number of tokens for acoustic analyses by lexical set, voicing context and speech style

		Conversational		**Citation form**	
Lexical set	**Voicing context**	Monosyl.	Bisyl.	Monosyl.	Bisyl.
BATH	Pre-voiceless	69	63	102	33
CLOTH	Pre-voiceless	53	14	61	34
DRESS	Pre-voiced	75	18	109	0
	Pre-voiceless	102	32	63	0
FACE	Pre-voiced	44	0	139	35
FLEECE	Pre-voiced	46	25	107	0
	Pre-voiceless	90	39	97	0
FOOT	Pre-voiced	28	0	66	0
	Pre-voiceless	115	14	104	0
GOAT	Pre-voiced	17	18	169	0
GOOSE	Pre-voiced	45	5	101	0
	Pre-voiceless	13	0	84	0
KIT	Pre-voiced	59	29	72	34
	Pre-voiceless	112	71	104	0
LOT	Pre-voiced	59	12	70	36
	Pre-voiceless	139	57	94	0
PALM	Pre-voiced	1	19	36	36
START	Pre-voiced	39	15	70	23
	Pre-voiceless	79	15	41	0
STRUT	Pre-voiced	43	66	66	3
	Pre-voiceless	95	46	105	0
THOUGHT	Pre-voiced	5	0	70	0
	Pre-voiceless	38	24	127	0
TRAP	Pre-voiced	49	29	103	0
	Pre-voiceless	84	69	98	0
Total		1499	680	2258	234

For spectral analyses, measurements of F1 and F2 were taken at one time point per vowel, representing the approximate vowel target. For FLEECE, KIT, FACE and DRESS, measurements were taken at the maximum value of F2 between 40% and 60% into the vowel. For GOOSE and FOOT, measurements were taken at the F2 minimum between 40% and 60% into the vowel. For the low vowels in TRAP, BATH, START and PALM, measurements were taken at the maximum value of F1 between 40% and 60% into the vowel. For the vowels in STRUT and LOT, no clear decision could be formed regarding the vowel target in respect to maximum of minimum formant frequency values. Therefore, measurements for all lexical sets pertaining to this general vowel quality subsystem (STRUT, LOT, THOUGHT, CLOTH, GOAT) were taken at the vowel midpoint i.e. at 50% into the vowel. All reported values are normalised formant frequencies.

Vowel duration was measured in milliseconds from vowel onset to vowel offset. In the analysis of overall temporal relations between lexical sets, following voicing contexts and speech styles (see section 5.5.2), raw duration values were used. For all subsequent analyses, vowel duration was normalised in an effort to control for different speaker-specific speech rates, which may be especially important for conversational data. In as far as vowel duration is a cue to vowel identity and post-vocalic voicing, what is important is the relative, not the absolute, duration of the vowel. As no information was available on the duration of the larger units of speech in which individual vowel tokens were contained such as syllables, words or phrases, only speaker-specific overall tendencies could be accounted for. Following Wassink (2006), duration measures were transformed to z-scores. For each speaker, the mean durations for each lexical set were calculated and, subsequently, the grandmean μ and standard deviation σ over these lexical set means. Z-scores for the duration of individual vowel tokens i of a given speaker are derived by subtracting the speaker's grandmean and dividing by the speaker's standard deviation (5.1). The transformation has the effect of representing individual vowel durations in terms of the number of standard deviations they diverge from the speaker's mean.

(5.1)
$$d_i^{norm} = \frac{d_i - \mu}{\sigma}$$

Spectral and temporal overlap of pre-specified long/short vowel pairs was quantified with the help of Mahalanobis distance calculations in two (F1'×F2') and three (F1'×F2'×Duration) dimensions. The Mahalanobis distance is a multi-dimensional algorithm measuring how many ellipsoid standard deviations a given point P is from the mean or centroid of a distribution D. The main advantage of the Mahalanobis distance over the Euclidean distance is that it takes into account the overall shape and dispersion of the multivariate distribution i.e. the variance of each variable and the covariance between variables. For each pair of vowel distributions V_1 and V_2

contrasted in the analyses, the Mahalanobis distance in two (F1'×F2') and three (F1'×F2'×Duration) dimensions of each token $v_{1,k}$ of V_1 to the centroid μ_2 of V_2 and of each token $v_{2,k}$ of V_2 to the centroid μ_1 of V_1 was calculated, using the formula in 5.2. S_j refers to the covariance matrix of the vowel distribution V_j. Subsequently, the median Mahalanobis distances in F1'×F2' space of V_1 towards V_2 and of V_2 towards V_1 were compared and the measures of whichever distribution V_j was on average closer to the other were retained and used to represent the proximity of the two vowel categories in both two and three dimensions.

$$\sqrt{(v_{i,k} - \mu_j)^t \times S_j^{-1} \times (v_{i,k} - \mu_j)}\ ; \quad i, j = 1, 2; \quad k = 1, ..., n \tag{5.2}$$

In order to facilitate the comparison of the results of the present study with those by Wassink (2001; 2006) on Jamaican Creole, overall temporal overlap between two vowel categories was also estimated using the traditional duration ratio method. In addition, the spectral overlap assessment metric (SOAM) devised by Wassink (2006) was applied to the data.

5.5 Results

5.5.1 Cross-comparison of vowel quality

This section presents a cross-comparison of vowel quality by task-based style (conversational, citation form), lexical set and voicing context (pre-voiced, pre-voiceless). The first result, based on visual assessment of the data, is that the vowel system of speakers in the conversational dataset are distributed in a basic V-shape in F1×F2 vowel space with its apex at /a/. For speakers in the citation form dataset, vowels also approach a V-shaped distribution, but low vowels involving the lexical sets TRAP, BATH, START and PALM show some differentiation in the front-back dimension, so that the distribution may be more adequately referred to as U-shaped. These distribution patterns are illustrated in figure 5.1, which displays values of normalised F1 and F2 for all vowel tokens at the approximate vowel target, separated by speech style. Lexical set labels indicate mean values of the respective vowel categories. Mean values and standard deviations of F1' and F2' for all lexical sets and speech styles are additionally listed in table 5.8.

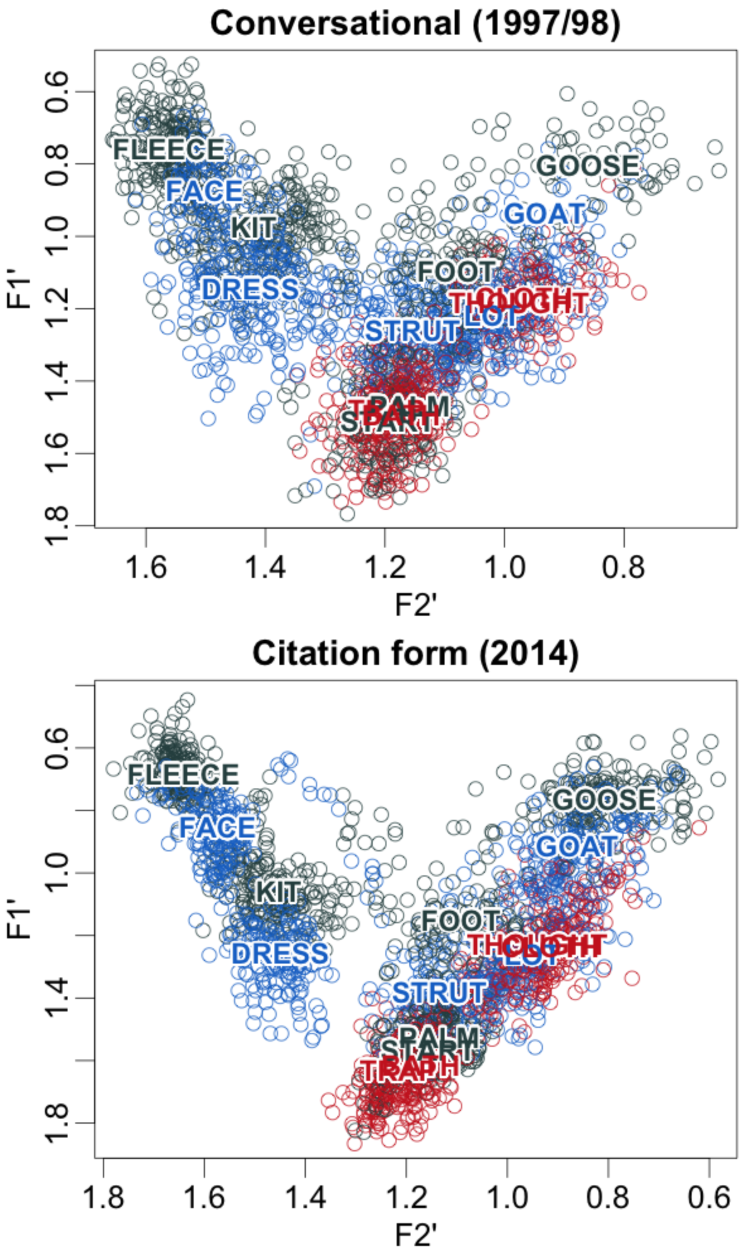

Figure 5.1: F1' and F2' for all vowel tokens at vowel target in the conversational (above) and citation form (below) dataset; labels indicate mean values

Table 5.8: F1' and F2' means and standard deviations by lexical set and style

	Conversational		Citation form	
Lexical set	F1	F2	F1	F2
FLEECE	0.76 (0.10)	1.56 (0.04)	0.68 (0.07)	1.64 (0.05)
FACE	0.87 (0.10)	1.50 (0.04)	0.85 (0.10)	1.57 (0.06)
KIT	0.97 (0.12)	1.42 (0.08)	1.06 (0.12)	1.45 (0.08)
DRESS	1.14 (0.12)	1.43 (0.06)	1.26 (0.12)	1.45 (0.07)
TRAP	1.48 (0.10)	1.20 (0.05)	1.63 (0.11)	1.21 (0.05)
BATH	1.49 (0.09)	1.17 (0.05)	1.62 (0.10)	1.17 (0.05)
START	1.51 (0.11)	1.20 (0.06)	1.56 (0.09)	1.16 (0.07)
PALM	1.47 (0.12)	1.16 (0.06)	1.52 (0.10)	1.13 (0.06)
STRUT	1.26 (0.11)	1.15 (0.09)	1.38 (0.12)	1.13 (0.06)
LOT	1.22 (0.11)	1.02 (0.08)	1.26 (0.14)	0.95 (0.08)
THOUGHT	1.18 (0.10)	0.98 (0.07)	1.23 (0.13)	0.94 (0.08)
CLOTH	1.17 (0.11)	0.97 (0.09)	1.24 (0.13)	0.91 (0.07)
FOOT	1.10 (0.12)	1.08 (0.09)	1.15 (0.12)	1.09 (0.10)
GOAT	0.93 (0.09)	0.93 (0.09)	0.91 (0.10)	0.86 (0.09)
GOOSE	0.80 (0.09)	0.86 (0.12)	0.76 (0.07)	0.81 (0.10)

In terms of differences in absolute values, it is clear that the vowels in citation form speech cover a wider area than those in conversational speech, as their highest, lowest, most front and most back vowel categories display more extreme values: On average, F1' values of FLEECE and GOOSE are 0.05 units lower, F1' values of TRAP and START are 0.11 units higher, F2' values of FLEECE are 0.08 units higher and F2' values of GOOSE are 0.05 units lower in citation form than in conversational speech. For the present study, however, it is of greater interest whether the relative positions of individual lexical sets differ between the two speech styles. From the vowel plots in figure 5.1 and from the mean values listed in table 5.8, it appears that KIT and DRESS are lower relative to FLEECE in citation form than in conversational speech, though there still remains a wide gap in low front vowel space. In conversational speech, low vowels lack differentiation in the front-back dimension. In citation form speech, PALM and START appear to be backed and raised relative to TRAP (and possibly BATH), reducing the gap in low back vowel space. THOUGHT, CLOTH and LOT overlap considerably in both speech styles, but STRUT seems to be closer to these lexical sets in conversational than in citation form speech. FOOT occupies a relatively central position in both speech styles.

Table 5.9: Mixed model analysis results: F1' and F2' by style (conversational, citation form), lexical set (FLEECE, KIT, DRESS, TRAP, START, STRUT, LOT, FOOT, GOOSE), and voicing context (pre-voiced, pre-voiceless)

Dependent variable **Significant factors**	**F**	**(df)**	**p-value**	
F1'				
style	16.5	$(1, 34.7)$	< 0.001	***
lexical set	1073.0	$(8, 146.9)$	< 0.001	***
voicing context	84.9	$(1, 219.5)$	< 0.001	***
style : lexical set	24.9	$(8, 385.6)$	< 0.001	***
lexical set : voicing context	5.5	$(8, 208.4)$	< 0.001	***
F2'				
lexical set	765.3	$(8, 336.7)$	< 0.001	***
voicing context	5.3	$(1, 408.3)$	< 0.05	*
style : lexical set	9.3	$(8, 1313.5)$	< 0.001	***
lexical set : voicing context	3.6	$(8, 403.3)$	< 0.001	***

Two separate mixed-effects model analyses were performed for F1' and F2' measures (see table 5.9) with fixed factors style (conversational, citation form), lexical set (FLEECE, KIT, DRESS, TRAP, START, STRUT, LOT, FOOT, GOOSE) and voicing context (pre-voiced, pre-voiceless). Only those lexical sets were included, for which an adequate number of tokens were available in both speech styles and voicing contexts. The tests revealed significant main effects for all fixed factors in the model for F1' and for fixed factors lexical set and voicing context in the model for F2'. In both models, the main effects were qualified by significant two-way interactions between style and lexical set and between lexical set and voicing contexts. Voicing context did not enter into significant interaction with style, which indicates that the effect of voicing context may differ for different lexical sets but can be assumed to operate similarly in different speech styles.

A range of post-hoc tests were performed. The contrast between conversational and citation form speech styles was tested in the context of the lexical sets FLEECE, GOOSE and TRAP in order to determine whether the centralisation of vowel space in conversational versus citation form speech was significant. In addition, interaction contrasts, i.e. contrasts-between-constrasts, were computed and the contrast between conversational and citation form speech styles were tested in relation to the contrast between the following pairs of lexical sets: FLEECE–KIT, DRESS–KIT, GOOSE–FOOT, LOT–STRUT, LOT–START and TRAP–START. The contrasts between each of these pairs of lexical sets were also tested in the context of conversational and citation form speech styles separately. Finally, the contrast between pre-voiced and pre-voiceless tokens was tested in the context of all lexical sets in the model. Significant results are listed in table 5.10 for dependent variable F1' and in table 5.11 for dependent variable F2'.

Table 5.10: Post-hoc test results: Analysis of simple main effects and interaction contrasts for interaction terms in table 5.9 for dependent variable F1'

Main effect: contrasted levels **Context of significant contrasts**	**Coef.**	**Chisq(df=1)**	**p-value**	
Style: conversational – citation form				
FLEECE	0.09	15.4	< 0.001	***
TRAP	−0.15	48.2	< 0.001	***
FLEECE – KIT	0.18	65.7	< 0.001	***
GOOSE – FOOT	0.13	30.0	< 0.001	***
TRAP – START	−0.11	30.7	< 0.001	***
Lexical set: FLEECE – KIT				
conversational	−0.21	300.4	< 0.001	***
citation form	−0.38	388.8	< 0.001	***
Lexical set: DRESS – KIT				
conversational	0.17	216.8	< 0.001	***
citation form	0.21	110.5	< 0.001	***
Lexical set: GOOSE – FOOT				
conversational	−0.25	99.6	< 0.001	***
citation form	−0.39	239.7	< 0.001	***
Lexical set: LOT – STRUT				
conversational	−0.07	32.3	< 0.001	***
citation form	−0.09	21.1	< 0.001	***
Lexical set: LOT – START				
conversational	−0.32	583.0	< 0.001	***
citation form	−0.28	224.2	< 0.001	***
Lexical set: TRAP – START				
citation form	0.08	17.6	< 0.001	***
Voicing context: pre-voiced – pre-voiceless				
DRESS	−0.09	31.4	< 0.001	***
FOOT	−0.12	9.4	< 0.05	*
KIT	−0.07	24.4	< 0.001	***
LOT	−0.08	31.8	< 0.001	***
STRUT	−0.07	21.7	< 0.001	***
TRAP	−0.05	7.1	< 0.05	*

Table 5.11: Post-hoc test results: Analysis of simple main effects and interaction contrasts for interaction terms in table 5.9 for dependent variable F2'

Main effect: contrasted levels **Context of significant contrasts**	**Coef.**	**Chisq(df=1)**	**p-value**	
Style: conversational – citation form				
FLEECE	−0.07	15.5	< 0.001	***
TRAP – START	−0.06	20.2	< 0.001	***
Lexical set: FLEECE – KIT				
conversational	0.14	196.8	< 0.001	***
citation form	0.18	100.8	< 0.001	***
Lexical set: GOOSE – FOOT				
conversational	−0.25	128.3	< 0.001	***
citation form	−0.27	132.0	< 0.001	***
Lexical set: LOT – STRUT				
conversational	−0.16	269.7	< 0.001	***
citation form	−0.15	64.0	< 0.001	***
Lexical set: LOT – START				
conversational	−0.19	284.79	< 0.001	***
citation form	−0.16	100.1	< 0.001	***
Lexical set: TRAP – START				
citation form	0.08	25.9	< 0.001	***
Voicing context: pre-voiced – pre-voiceless				
KIT	0.05	14.1	< 0.01	**

F1' in FLEECE was significantly smaller and F2' was significantly larger in citation form than conversational speech, indicating a higher and more front position. F1' in TRAP was significantly larger in citation form than conversational speech, indicating a lower position. The position of GOOSE did not differ significantly across speech styles. The lexical sets FLEECE and KIT, GOOSE and FOOT, LOT and STRUT, and LOT and START were spectrally distinct with respect to F1' and F2' in both speech styles. DRESS and KIT were spectrally distinct only with respect to F1' in both speech styles. TRAP and START were spectrally distinct only in citation form speech, where both F1' and F2' were smaller in START than in TRAP, indicating a raised and more back position. The contrast between FLEECE and KIT and between GOOSE and FOOT in the F1' dimension, though significant in both speech styles, was significantly larger in citation form than in conversational speech. The contrast between TRAP and START was significantly larger in citation form than in conversational speech with respect to both F1' and F2' dimensions. As for the effect of voicing context, all lexical sets except those representing traditionally 'long' vowel categories, i.e. FLEECE, GOOSE and START, had significantly higher F1' values in pre-voiceless than in pre-voiced contexts, indicating a lower position in vowel space. Only KIT showed significantly lower F2' values in pre-voiceless than in pre-voiced contexts, indicating a more back position.

5.5.2 Cross-comparison of vowel quantity

This section presents a cross-comparison of vowel quantity by task-based by style (conversational, citation form), lexical set (FLEECE, KIT, DRESS, TRAP, START, STRUT, LOT, FOOT, GOOSE) and voicing context (pre-voiced, pre-voiceless). Only those lexical sets were included, for which an adequate number of tokens were available in both speech styles and voicing contexts. Figure 5.2 displays mean vowel durations in milliseconds for the nine lexical sets across styles and voicing contexts. Averaged across all nine lexical sets, citation form vowels were 44.3 ms longer than conversational vowels, and vowels in pre-voiced contexts were 68.9 ms longer than those in pre-voiceless contexts. The two factors, however, obviously interact with each other and the difference between the two styles was greater in pre-voiced (61.4 ms) than in pre-voiceless (27.2 ms) contexts.

The durational rank of different lexical sets remained fairly stable across styles and contexts: KIT and FOOT were invariably the shortest vowels, followed by STRUT. FLEECE was the shortest of the traditionally long vowels, followed by vowels of similar durations in GOOSE, LOT, DRESS and TRAP; the vowel in START was generally the longest. This patterns reflects to some extent the greater degree of vocalic openness in for example STRUT vis-a-vis KIT and FOOT or START and TRAP vis-a-vis FLEECE and GOOSE. The duration of short relative to long vowels, however, also varies as a function of both voicing context and style. As seen in figure 5.2, vowel duration rises relatively abruptly from FOOT to FLEECE in pre-voiced citation form tokens, but increases more gradually for pre-voiced conversational tokens. Pre-voiceless tokens in both styles display a very slow, gradual increase in duration from KIT to TRAP and then a sharp rise from TRAP to START. The temporal difference between 'short' KIT and FOOT and 'long' FLEECE and GOOSE is largest in pre-voiced citation form tokens.

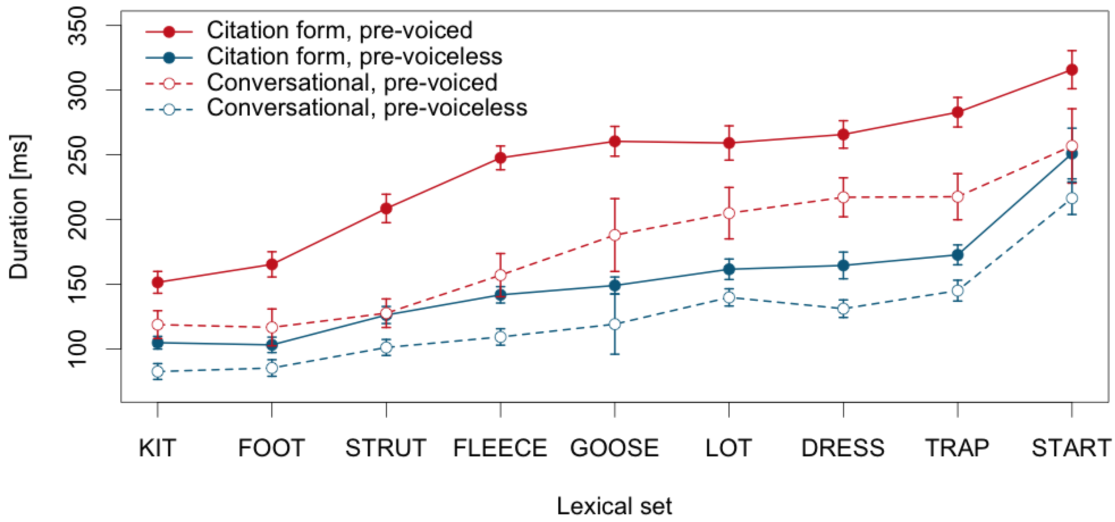

Figure 5.2: Mean vowel durations and 95% confidence intervals for nine lexical sets by speech style and following voicing context

Table 5.12: Mixed model analysis results: Vowel duration [ms] by task-based style (conversational, citation form), voicing context (pre-voiced, pre-voiceless), and lexical set (KIT, FOOT, STRUT, FLEECE, GOOSE, LOT, DRESS, TRAP, START)

Dependent variable **Significant factors**	**F**	**(df)**	**p-value**	
Duration				
style	21.2	$(1, 36.3)$	< 0.001	***
voicing context	262.3	$(1, 144.3)$	< 0.001	***
lexical set	59.3	$(8, 142.6)$	< 0.001	***
style : voicing context	37.4	$(1, 226.7)$	< 0.001	***
voicing context : lexical set	3.7	$(8, 152.2)$	< 0.001	***
style : voicing context : lexical set	2.2	$(8, 294.6)$	< 0.05	*

A mixed-effects model analysis was performed for duration in milliseconds with fixed factors style, voicing context and lexical set. The test revealed significant main effects for all fixed factors, which were, however, qualified by interactions including a significant three-way interaction (see table 5.12). Subsequent post-hoc tests (see table 5.13) of simple main effects showed that the effect of style was significant for pre-voiced tokens of vowels in all lexical sets except the shortest, the vowel in KIT, but it was not significant for vowels in pre-voiceless contexts The effect of voicing context in citation form tokens was significant for all lexical sets except the two shortest, KIT and FOOT. In conversational speech, pre-voiced were significantly longer than pre-voiceless tokens in FLEECE, GOOSE, LOT, DRESS and TRAP, that is in all lexical sets except in the three shortest, KIT, FOOT and STRUT, and in the longest, START. The factor lexical set has nine levels, which results in a high number of potential pairwise comparisons across different voicing contexts and styles. In order to retain a manageable number of contrasts, only the following contrasts were tested: KIT–STRUT, FLEECE–KIT, FLEECE–STRUT, FLEECE–TRAP, FOOT–GOOSE, GOOSE–STRUT, GOOSE–TRAP, and START–TRAP. The difference between the short vowels in KIT and STRUT was not significant. The difference between the shortest 'long' vowel FLEECE and its short counterpart KIT was significant only in pre-voiced contexts in citation form. Conversely, FLEECE was found significantly shorter then TRAP only in conversational speech, irrespective of voicing contexts. These results reflect the durational differences of pre-voiced FLEECE conditioned by speech style. The difference between FLEECE and STRUT was not significant, but GOOSE was significantly longer than STRUT in pre-voiced contexts in conversational speech. In pre-voiced contexts, GOOSE was also significantly longer than its short counterpart FOOT in both speech styles; in pre-voiceless contexts, GOOSE was only significantly longer than FOOT in citation form. The durational difference between long vowels except FLEECE and START was generally very small; the contrast between GOOSE and TRAP was not significant. The sharp increase in duration in START relative to TRAP is reflected in significant results for this contrast for pre-voiceless citation form tokens as well as conversational tokens in both voicing contexts.

Table 5.13: Post-hoc test results: Analysis of simple main effects of interaction term in table 5.12 for dependent variable duration

Main effect: contrasted levels **Context of significant contrasts**	**Coef.**	**Chisq(df=1)**	**p-value**	
Style: citation form – conversational				
pre-voiced, STRUT	−76.3	12.7	< 0.05	*
pre-voiced, FLEECE	−101.4	40.9	< 0.001	***
pre-voiced, GOOSE	−49.1	15.4	< 0.01	**
pre-voiced, LOT	−66.8	10.7	< 0.05	*
pre-voiced, DRESS	−57.1	27.2	< 0.001	***
pre-voiced, TRAP	−84.9	50.6	< 0.001	***
pre-voiced, START	−46.9	15.0	< 0.01	**
Voicing context: pre-voiced – pre-voiceless				
conversational, FLEECE	45.8	15.8	< 0.01	**
conversational, GOOSE	63.2	17.2	< 0.001	**
conversational, LOT	41.5	20.7	< 0.001	***
conversational, DRESS	77.5	45.5	< 0.001	***
conversational, TRAP	57.9	21.9	< 0.001	***
citation form, STRUT	71.5	12.8	< 0.01	*
citation form, FLEECE	120.1	63.6	< 0.001	***
citation form, GOOSE	77.1	28.8	< 0.001	***
citation form, LOT	89.6	21.3	< 0.05	***
citation form, DRESS	102.9	30.7	< 0.001	***
citation form, TRAP	129.0	66.4	< 0.001	***
citation form, START	44.8	11.3	< 0.001	*
Lexical set: FLEECE – KIT				
citation form, pre-voiced	114.5	36.2	< 0.001	***
Lexical set: FLEECE – TRAP				
conversational, pre-voiced	−51.8	13.9	< 0.01	**
conversational, pre-voiceless	−39.8	17.4	< 0.01	**
Lexical set: FOOT–GOOSE				
conversational, pre-voiced	−80.9	17.9	< 0.01	**
citation form, pre-voiced	−75.2	16.4	< 0.01	**
citation form, pre-voiceless	−49.6	10.4	< 0.05	*
Lexical set: GOOSE – STRUT				
conversational, pre-voiced	58.2	17.6	< 0.01	**
Lexical set: START – TRAP				
conversational, pre-voiced	50.3	13.2	< 0.05	*
conversational, pre-voiceless	74.0	53.8	< 0.001	***
citation form, pre-voiceless	96.5	39.6	< 0.001	***

5.5.3 Variation in low vowels

5.5.3.1 Conversational data

For the conversational dataset, not enough tokens were available of the lexical set PALM to include them in the analysis, which therefore focussed exclusively on TRAP, START and BATH. None of the tokens of START were pronounced r-full. Figure 5.3 shows the mean F1' and F2' values for each lexical set by social group and voicing context. Only pre-voiceless tokens were available for the vowel in BATH. In pre-voiceless contexts, it seems there is little difference between the realisations of the three lexical sets. In pre-voiced contexts, F1' in TRAP is smaller than in START in all social groups, but START is also characterised by some variation. F1' values for higher-class females in general are smaller than for the other social groups.

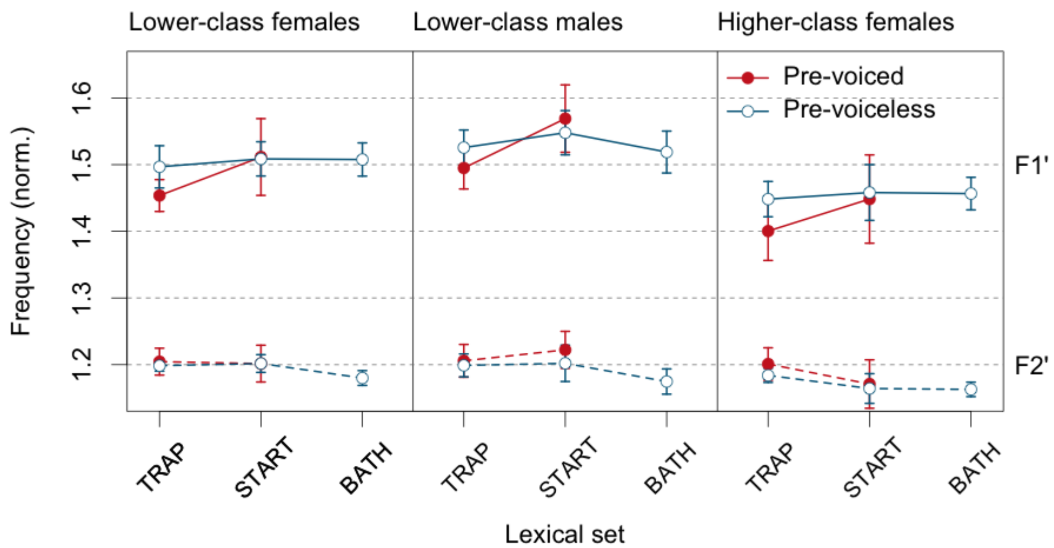

Figure 5.3: Mean F1' and F2' values and 95% confidence intervals for the lexical sets TRAP, START and BATH by social group and voicing context

Figure 5.4 displays mean normalised duration values for TRAP, START and BATH by social group and voicing context. In terms of duration, BATH appears to pattern with START, which is longer than TRAP, at least in pre-voiceless contexts. In pre-voiced contexts, START is longer than TRAP in the speech of lower-class males and higher-class females, though in the latter, START is characterised by considerable variability. Lower-class females do not seem to distinguish TRAP and START temporally in pre-voiced contexts.

Figure 5.4: Mean normalised duration values and 95% confidence intervals for the lexical sets TRAP, START and BATH by social group and voicing context

Separate mixed-effects model analyses were performed for dependent variables F1', F2' and normalised duration in pre-voiced and pre-voiceless contexts. Fixed factors in all six models were defined as lexical set (TRAP, START for models restricted to pre-voiced data; TRAP, START, BATH for models restricted to pre-voiceless data) and social group (lower-class females, lower-class males, higher-class females). The results are listed in tables 5.14 and 5.15.

In pre-voiced contexts, F1' was significantly affected by both main factors, lexical set and social group. This indicates that F1' in START was significantly higher than in TRAP for all social groups. As for variation by social group, post-hoc tests revealed that lower-class males had significantly higher F1' values than higher-class females ($coef = 0.09; chisq = 8.0; p < 0.05$). F2' was not significantly affected by the factors in the model. Duration was affected significantly by lexical set, qualified by a significant interaction between lexical set and social group. An analysis of simple main effects revealed that the durational contrast between START and TRAP was significant only for higher-class females ($coef = 1.76; chisq = 14.0; p < 0.01$). An analysis of interaction contrasts showed that the durational contrast

Table 5.14: Mixed model analysis results; conversational data restricted to pre-voiced contexts: Dependent variables F1', F2' and duration (all normalised) by lexical set (TRAP, START) and social group (lower-class females, lower-class males, higher-class females)

Dependent variable **Significant factors**	**F**	**(df)**	**p-value**	
F1 (norm.)				
lexical set	6.6	$(1, 13.1)$	< 0.05	*
social group	4.0	$(2, 13.0)$	< 0.05	*
F2 (norm.)				
no significant effects				
Duration (norm.)				
lexical set	10.5	$(1, 7.3)$	< 0.05	*
lexical set : social group	4.7	$(2, 81.0)$	< 0.05	*

between START and TRAP was significantly lower for lower-class than for higher-class females ($coef = -1.80; chisq = 9.1; p < 0.05$).

Table 5.15: Mixed model analysis results; conversational data restricted to pre-voiceless contexts: Dependent variables F1', F2' and duration (all normalised) by lexical set (TRAP, START, BATH) and social group (lower-class females, lower-class males, higher-class females)

Dependent variable **Significant factors**	**F**	**(df)**	**p-value**	
F1 (norm.)				
no significant effects				
F2 (norm.)				
lexical set	4.7	$(2, 27.2)$	< 0.05	*
Duration (norm.)				
lexical set	35.1	$(2, 40.6)$	< 0.001	***

In pre-voiceless contexts, the tests did not reveal significant factor effects on variation in F1'. The models for both F2' and duration revealed significant effects for lexical set. Posts-hoc tests showed that F2' in TRAP was significantly higher than in BATH, though only to a small extent ($coef = -0.02; chisq = 8.9; p < 0.01$). Duration in both BATH ($coef = 1.31; chisq = 47.0; p < 0.001$) and START ($coef = 1.35; chisq = 55.9; p < 0.001$) was significantly longer than in TRAP.

5.5.3.2 Citation form data

In the citation form data, rhotic pronunciation of START was quite common, especially among higher-class female speakers (see table 5.16). Males of both higher- and lower social classes exhibited an approximately equal amount of rhotic tokens; about half of their productions of START were rhotic. Lower-class females, which were, on average, also older than the other participants, showed only about 10% rhotic tokens in START.

Table 5.16: Rhotic tokens of START by social class and gender

Social group	Total number of tokens	Prop. of rhotic tokens
Lower-class females	62	9.7%
Lower-class males	84	57.1%
Higher-class females	91	92.3%
Higher-class males	79	55.7%

A generalised linear mixed-effects model was fit to the data with dependent binomial variable rhotic versus non-rhotic START and fixed factors social class and gender. Type II Wald chi-square tests revealed a significant main effect of social class ($chisq = 7.5; df = 1; p < 0.01$) and a significant interaction between social class and gender ($chisq = 13.0; df = 1; p < 0.001$). Subsequent post-hoc tests showed a significant effect of social class for female speakers ($coef = -0.8; chisq = 21.2; p < 0.001$) and a significant effect of gender for lower-class speakers ($coef = -0.5; chisq = 7.6; p < 0.05$).

Due to the lowering effect that /r/ may have on F2 formant frequencies of preceding vowels, all following analyses were conducted exclusively on non-rhotic tokens. As female higher-class speakers had only very few non-rhotic tokens of START (n=7), male and female higher-class speakers were combined to a single social group of higher-class speakers. Figure 5.5 shows the mean F1' and F2' values for the lexical sets PALM, TRAP, START and BATH by social group and voicing context. Only pre-voiceless tokens were available for the vowel in BATH, while only pre-voiced tokens were available for the vowel in PALM. For lower-class female speakers, differences between the lexical sets were only marginal, but they followed the same pattern observed for the other two social groups: TRAP was characterised by higher F1' and F2' values than all other lexical sets, irrespective of the following voicing context. PALM and START in pre-voiced contexts had generally comparably low values of

F1’ and F2’. In pre-voiceless contexts, BATH was spectrally positioned between TRAP and START.

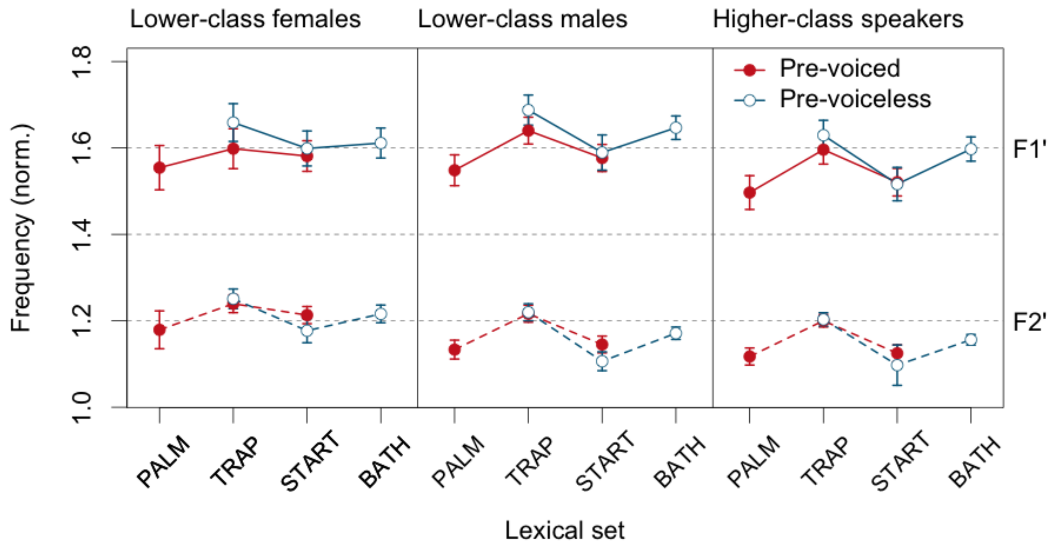

Figure 5.5: Mean F1’ and F2’ values and 95% confidence intervals for the lexical sets PALM, TRAP, START and BATH by social group and voicing context

Figure 5.6 displays mean normalised vowel durations for PALM, TRAP, START and BATH by social group and voicing context. In pre-voiceless contexts, TRAP is clearly shorter than both START and BATH; in terms of duration, then, BATH patterns with START rather than TRAP, as was also the case in the conversational data. The durational difference between lexical sets was generally smaller in pre-voiced contexts, but here, too, TRAP showed a tendency for shorter durations than both PALM and START. Lower-class males showed especially long vowel durations in START.

Separate mixed-effects model analyses were performed for dependent variables F1’, F2’ and normalised duration in pre-voiced and pre-voiceless contexts. Fixed factors in all six models were defined as lexical set (PALM, TRAP, START for models restricted to pre-voiced data; TRAP, START, BATH for models restricted to pre-voiceless data) and social group (lower-class females, lower-class males, higher-class speakers). The results are listed in tables 5.17 and 5.18.

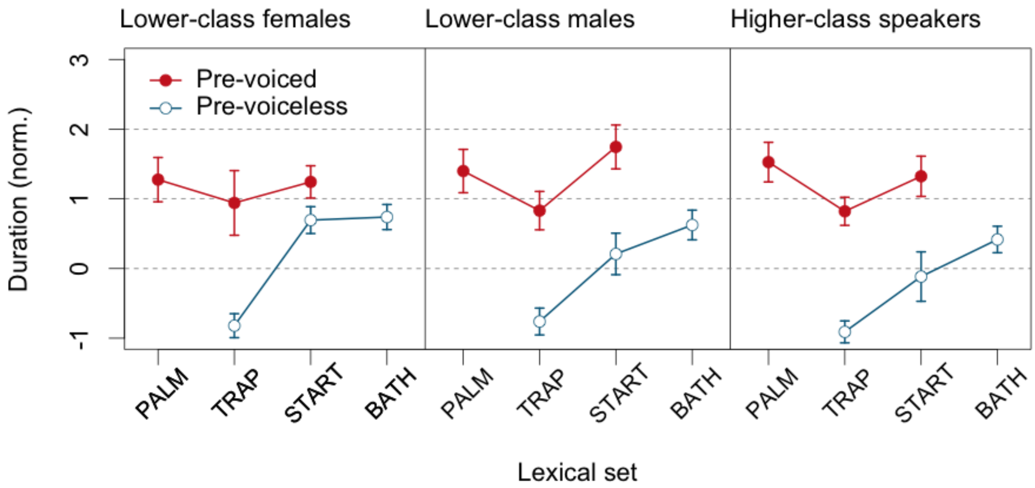

Figure 5.6: Mean normalised duration values and 95% confidence intervals for the lexical sets PALM, TRAP, START and BATH by social group and voicing context

Table 5.17: Mixed model analysis results; citation form data restricted to pre-voiced contexts: Dependent variables F1', F2' and duration (all normalised) by lexical set (PALM, TRAP, START) and social group (lower-class females, lower-class males, higher-class speakers)

Dependent variable **Significant factors**	**F**	**(df)**	**p-value**	
F1 (norm.)				
lexical set	15.8	$(2, 9.0)$	< 0.01	**
F2 (norm.)				
lexical set	8.4	$(2, 10.8)$	< 0.01	**
Duration (norm.)				
no significant effects				

In pre-voiced contexts, F1' and F2' were both affected significantly by lexical set. An analysis of simple main effects showed that PALM ($coef = -0.08; chisq = 30.6; p < 0.001$) and START ($coef = -0.08; chisq = 20.3; p < 0.001$) had significantly lower F1' values than TRAP; PALM ($coef = -0.08; chisq = 12.6; p < 0.001$) and START ($coef = -0.08; chisq = 14.6; p < 0.001$) also had significantly lower F2' values than TRAP. Duration was not significantly affected by any factor in the model.

Table 5.18: Mixed model analysis results; citation form data restricted to pre-voiceless contexts: Dependent variables F1', F2' and duration (all normalised) by lexical set (TRAP, START, BATH) and social group (lower-class females, lower-class males, higher-class speakers)

Dependent variable **Significant factors**	**F**	**(df)**	**p-value**	
F1 (norm.)				
lexical set	15.8	$(2, 9.6)$	< 0.001	***
lexical set : social group	2.5	$(4, 217.2)$	< 0.05	*
F2 (norm.)				
lexical set	20.1	$(2, 11.6)$	< 0.001	***
Duration (norm.)				
lexical set	24.4	$(2, 9.0)$	< 0.001	***
social group	4.2	$(2, 21.1)$	< 0.05	*

In pre-voiceless contexts, the model for F1' revealed a significant interaction between lexical set and social group. Subsequent post-hoc tests showed that the contrast between START and TRAP was significant for lower-class males ($coef = -0.12; chisq = 21.8; p < 0.001$) and higher-class speakers ($coef = -0.15; chisq = 25.6; p < 0.001$), as was the contrast between START and BATH (lower-class males: $coef = -0.09; chisq = 12.0; p < 0.01$; higher-class speakers: $coef = -0.11; chisq = 16.2; p < 0.001$). The model for F2' revealed a significant effect of lexical set, and post-hoc tests showed that all pairwise comparisons were significant: START had lower F2' values than TRAP ($coef = -0.10; chisq = 36.5; p < 0.001$) or BATH ($coef = -0.05; chisq = 14.8; p < 0.001$), and BATH had lower F2' values than TRAP ($coef = -0.05; chisq = 26.4; p < 0.001$). Duration was significantly affected by both main effects in the model, lexical set and group. Post-hoc tests showed that both START ($coef = 1.12; chisq = 26.7; p < 0.001$) and BATH ($coef = 1.38; chisq = 44.0; p < 0.001$) were significantly longer than TRAP. Across lexical sets, lower-class females produced significantly longer vowels than higher-class speakers ($coef = 0.31; chisq = 8.4; p < 0.05$).

5.5.4 Variation in mid back vowels

5.5.4.1 Conversational data

For the conversational dataset, pre-voiced tokens in adequate numbers were only available for the vowel in LOT. The statistic analyses were therefore restricted to pre-voiceless contexts of LOT, THOUGHT and CLOTH. Figure 5.7 shows the mean F1' and F2' values for each lexical set by social group and voicing context. Pre-voiceless LOT has consistently the highest values for both F1' and F2', while CLOTH tends to have F1' and F2' values equal to or lower than THOUGHT. Across lexical sets, males have slightly higher values than females.

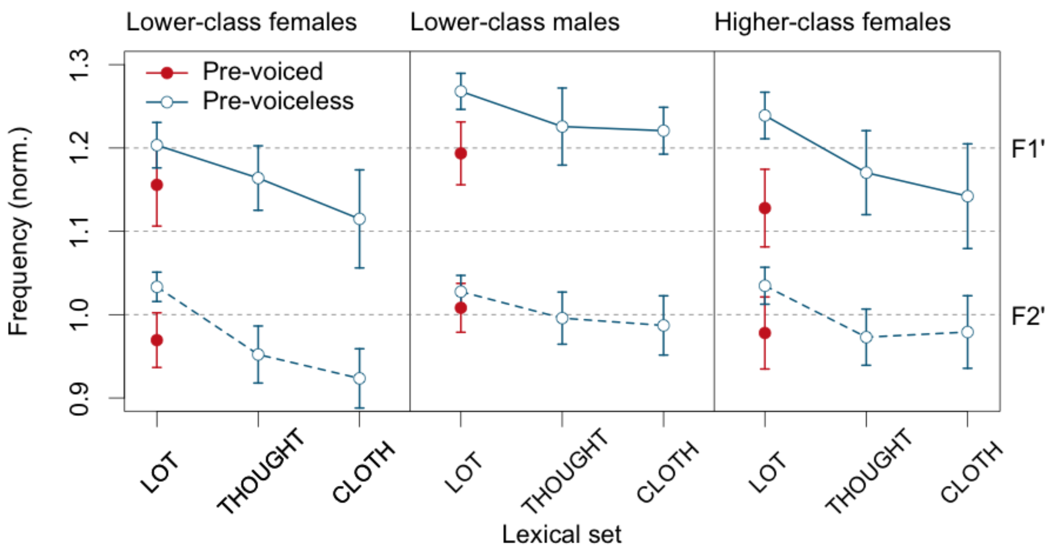

Figure 5.7: Mean F1' and F2' values and 95% confidence intervals for the lexical sets LOT, THOUGHT and CLOTH by social group and voicing context

Figure 5.8 displays mean normalised duration values for LOT, THOUGHT and CLOTH by social group and voicing context. Pre-voiceless LOT is consistently shorter than both THOUGHT and CLOTH. The durations of THOUGHT and CLOTH are approximately equal, though THOUGHT may be shorter for higher-class females than for lower-class speakers.

Figure 5.8: Mean normalised duration values and 95% confidence intervals for the lexical sets LOT, THOUGHT and CLOTH by social group and voicing context

Separate mixed-effects model analyses were performed for dependent variables F1', F2' and normalised duration in pre-voiceless contexts. Fixed factors in all three models were defined as lexical set (LOT, THOUGHT, CLOTH) and social group (lower-class females, lower-class males, higher-class females). The results are listed in table 5.19. In all three analyses, only the factor lexical set reached significance. Post-hoc tests revealed that the contrast between LOT and THOUGHT was significant in both spectral dimensions (F1': $coef = 0.05; chisq = 6.3; p < 0.05$; F2': $coef = 0.05; chisq = 5.1; p < 0.05$) and in terms of duration ($coef = -0.77; chisq = 6.9; p < 0.05$), as was the contrast between LOT and CLOTH (F1': $coef = 0.06; chisq = 8.4; p < 0.05$; F2': $coef = 0.05; chisq = 7.3; p < 0.05$; duration: $coef = -0.69; chisq = 6.7; p < 0.05$).

Table 5.19: Mixed model analysis results; conversational data restricted to pre-voiceless contexts: Dependent variables F1', F2' and duration (all normalised) by lexical set (LOT, THOUGHT, CLOTH) and social group (lower-class females, lower-class males, higher-class females)

Dependent variable **Significant factors**	**F**	**(df)**	**p-value**	
F1 (norm.)				
lexical set	5.9	$(2, 27.2)$	< 0.01	**
F2 (norm.)				
lexical set	4.7	$(2, 32.8)$	< 0.05	*
Duration (norm.)				
lexical set	5.8	$(2, 20.3)$	< 0.05	*

5.5.4.2 Citation form data

Figure 5.9 shows the mean F1' and F2' values for each lexical set by social class, gender and voicing context for the citation form data. CLOTH only occurs in pre-voiceless contexts. As in the conversational data, pre-voiceless LOT displays the highest values of F1' and F2', but the contrast between the lexical sets seems to be more salient in the F1'-dimension. F1' and F2' in pre-voiceless THOUGHT and CLOTH are approximately equal. In pre-voiced contexts, the spectral contrast between LOT and THOUGHT disappears – in the speech of higher-class males, LOT may even have slightly lower F1' and F2' values than THOUGHT. Across lexical sets and voicing contexts, males display higher values than females.

Figure 5.10 displays mean normalised duration values for LOT, THOUGHT and CLOTH by social class, gender and voicing context. Pre-voiceless LOT is consistently shorter than both THOUGHT and CLOTH. The durations of pre-voiceless THOUGHT and CLOTH are approximately equal for higher-class males, but, generally, THOUGHT tends to be positioned in-between LOT and CLOTH in terms of vowel duration. In pre-voiced contexts, LOT is clearly shorter than THOUGHT, though the extent of the contrast varies somewhat across social class and gender.

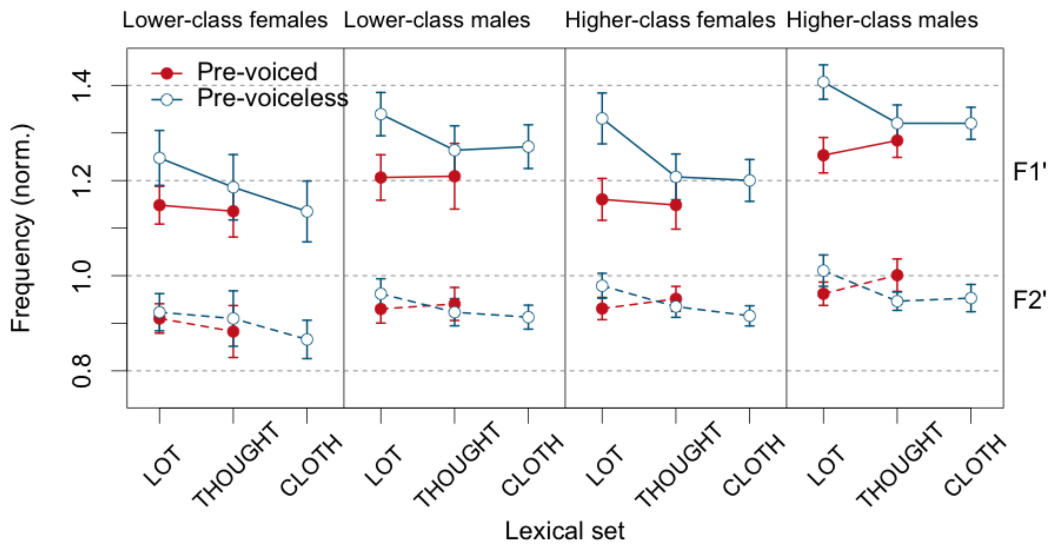

Figure 5.9: Mean F1' and F2' values and 95% confidence intervals for the lexical sets LOT, THOUGHT and CLOTH by social group and voicing context

Figure 5.10: Mean normalised duration values and 95% confidence intervals for the lexical sets LOT, THOUGHT and CLOTH by social group and voicing context

Separate mixed-effects model analyses were performed for dependent variables F1', F2' and normalised duration in pre-voiced and pre-voiceless contexts. Fixed factors in all six models were defined as lexical set (LOT, THOUGHT for models restricted to pre-voiced data; LOT, THOUGHT, CLOTH for models restricted to pre-voiceless data), social class (lower-class, higher-class), and gender (female, male). The results are listed in tables 5.20 and 5.21.

Table 5.20: Mixed model analysis results; citation form data restricted to pre-voiced contexts: Dependent variables F1', F2' and duration (all normalised) by lexical set (LOT, THOUGHT), social class (lower-class, higher-class) and gender (female, male)

Dependent variable **Significant factors**	**F**	**(df)**	**p-value**	
F1 (norm.)				
no significant effects				
F2 (norm.)				
no significant effects				
Duration (norm.)				
lexical set	46.8	$(1, 2.7)$	< 0.01	**

Table 5.21: Mixed model analysis results; citation form data restricted to pre-voiceless contexts: Dependent variables F1', F2' and duration (all normalised) by lexical set (LOT, THOUGHT, CLOTH), social class (lower-class, higher-class) and gender (female, male)

Dependent variable **Significant factors**	**F**	**(df)**	**p-value**	
F1 (norm.)				
lexical set	4.6	$(2, 8.9)$	< 0.05	*
gender	8.2	$(1, 16.4)$	< 0.05	*
F2 (norm.)				
lexical set	6.8	$(2, 10.6)$	< 0.05	*
Duration (norm.)				
lexical set	8.8	$(2, 7.5)$	< 0.05	*
gender	4.7	$(1, 17.0)$	< 0.05	*

As expected, in pre-voiced contexts, only the model for duration showed a significant effect of lexical set; social class and gender did not have a significant impact on either F1', F2' or duration. This indicates that, in pre-voiced contexts, the spectral contrast between LOT and THOUGHT is not significant, but LOT is significantly shorter than THOUGHT.

In pre-voiceless contexts, the factor lexical set had a significant effect on all dependent variables. Post-hoc tests showed that the contrast between LOT and

THOUGHT was significant in both spectral dimensions (F1': $coef = 0.08; chisq = 6.9; p < 0.05$; F2': $coef = 0.04; chisq = 7.5; p < 0.05$) and in terms of duration ($coef = -0.72; chisq = 8.5; p < 0.01$), as was the contrast between LOT and CLOTH (F1': $coef = 0.09; chisq = 7.5; p < 0.05$; F2': $coef = 0.05; chisq = 12.8; p < 0.01$; duration: $coef = -1.23; chisq = 16.4; p < 0.001$). In addition to lexical set, F1' and duration were also significantly affected by speaker gender; that is, males displayed significantly higher F1' values and shorter vowel durations than females.

5.5.5 Spectral and temporal overlap

This section's focus is mainly descriptive, its primary aim being to describe the relative spectral and temporal contributions to phonemic distinctions in selected vowel pairs and to enable comparison with the studies conducted on JamC by Wassink (2001, 2006). The interaction between spectral and temporal contrasts will be analysed for four pairs of vowels: /iː, i/ in FLEECE and KIT, /aː, a/ in START/PALM and TRAP, /oː, o/ in THOUGHT/CLOTH and LOT, and /uː, u/ in GOOSE and FOOT. As the results in the previous sections have shown, PALM consistently patterned with START and CLOTH with THOUGHT, so these lexical sets were combined in the following analyses. Although social variation in the low and mid-back vowels showed to be minimal, higher-class female speakers were excluded from the conversational dataset and lower-class female speakers from the citation form dataset in order to obtain two maximally divergent and internally homogenous systems. For the conversational data, only one token of pre-voiced FOOT was available [1] and it was subsequently excluded from the analysis.

Figure 5.11 shows the position of the four vowel pairs /iː, i/ ('i'), /aː, a/ ('a'), /oː, o/ ('o'), and /uː, u/ ('u') with respect to logarithmically transformed median Mahalanobis distances in two (F1'×F2') and in three (F1'×F2' ×Duration) dimensions, further distinguished by the following voicing context. The vertical and horizontal dashed lines represent the lower margins (p=0.05) of statistical significance of the contrast between vowel pairs in two (Mahalanobis distance ≈ 2.45) and in three

[1] Only one token of pre-voiced FOOT was available other than tokens of the word *good*, which were excluded from all spectral analysis (see section 5.4).

(Mahalanobis distance ≈ 2.80) dimensions, assuming an underlying chi-square distribution with two and three degrees of freedom, respectively. The positions of the individually contrasted vowel pairs can be interpreted as follows: If the median Mahalanobis distances in two and three dimensions position them in the lower left quartile of the plot, at least 50% of the tokens of one of the contrasted vowel categories are not significantly different from those of the other, irrespective of whether temporal information is included in the contrast calculations or not. If contrasted vowel pairs are positioned in the upper right quartile, at least 50% of the tokens in both vowel distributions are significantly different from each other based on their spectral characteristics, and their temporal characteristics may have contributed further to their distinction. If contrasted vowel pairs are positioned in the upper left quartile, at least 50% of the tokens of one of the contrasted vowel categories are not significantly different from those of the other in terms of spectral characteristics, but they are distinguished based on their temporal characteristics. The actual median Mahalanobis distance values, corresponding to the logarithmically transformed values in the plots, are listed in table 5.22, along with the proportion of tokens of the smaller vowel distribution protruding into the 95% probability space of the larger vowel distribution.

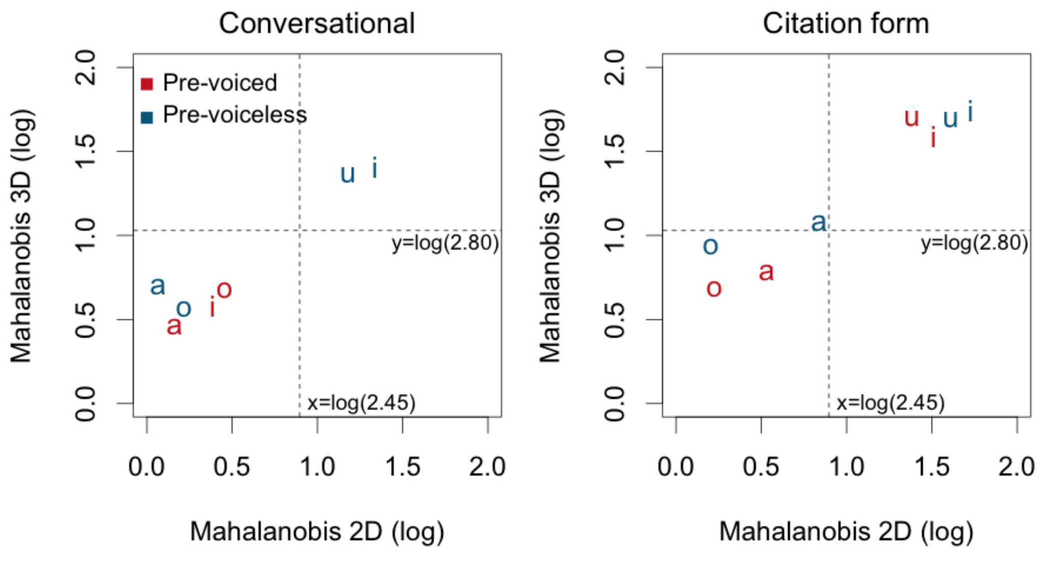

Figure 5.11: Logarithmically transformed median Mahalanobis distances in two (F1'×F2') and three (F1'×F2'×Duration) dimensions for /iː, i/ ('i'), /aː, a/ ('a'), /oː, o/ ('o'), and /uː, u/ ('u') by following voicing context

Table 5.22: Median Mahalanobis distances and proportion of overlapping tokens in two (F1'×F2') and three (F1'×F2'×Duration) dimensions for selected vowel pairs by following voicing context

		Median Mahal. dist.		Prop. of overlap	
Vowel pair	Voicing context	2D	3D	2D	3D
Conversational					
/aː, a/	pre-voiced	1.18	1.58	92%	92%
	pre-voiceless	1.07	2.01	88%	73%
/oː, o/	pre-voiced	1.58	1.97	100%	67%
	pre-voiceless	1.24	1.76	92%	92%
/iː, i/	pre-voiced	1.47	1.79	100%	96%
	pre-voiceless	3.82	4.09	8%	11%
/uː, u/	pre-voiceless	3.26	3.91	21%	11%
Citation form					
/aː, a/	pre-voiced	1.71	2.18	73%	75%
	pre-voiceless	2.31	2.94	63%	37%
/oː, o/	pre-voiced	1.25	1.99	96%	89%
	pre-voiceless	1.23	2.55	89%	57%
/iː, i/	pre-voiced	4.52	4.92	4%	4%
	pre-voiceless	5.62	5.71	0%	0%
/uː, u/	pre-voiced	4.00	5.48	3%	1%
	pre-voiceless	5.00	5.44	0%	0%

Low and mid-back vowel subsystems cluster in the lower left of the plot for both speech styles, while high vowel subsystems tend to cluster in the upper right; an exception to this pattern is the vowel pair represented by 'i' i.e. /iː, i/ in pre-voiced contexts, which is found among 'o' and 'a' in the conversational data. In the conversational data, the difference between Mahalanobis distances in two and three dimensions is generally moderate. Vowel pairs which are, on average, not clearly distinguished in two dimensions do not show extremely large contrasts in three dimensions. /aː, a/ in pre-voiceless contexts showed the greatest change when temporal information was added to the contrast calculations: the median Mahalanobis distance increased from 1.07 to 2.01, and the proportion of overlapping tokens of the smaller vowel distribution decreased from 88% to 73%. Pre-voiced /oː, o/ also showed considerable change from the two- to the three-dimensional model. While this was not as clearly reflected in the median Mahalanobis distance, which only increased from 1.25 to 1.99, the tokens of the vowel pairs, especially of long /oː/ in THOUGHT and CLOTH, were extremely variable with respect to vowel duration (cf. figure 5.8 in previous section); this caused a considerable decrease in overlapping tokens from 100% in two dimensions to 67% in three. In the citation form data, the proximity of the vowel pairs seemed to correlate not only with the relative openness of the vowel categories involved but also with the following voicing context: Based on both median Mahalanobis distance values as well as the proportion of overlapping tokens, the contrast between vowels in pre-voiceless contexts was greater than in pre-voiced contexts. In the mid-back vowel pair /oː, o/, duration appeared to play an important role in marking contrast, especially in pre-voiceless contexts.

In order to test these observations, the Mahalanobis distances calculated for each vowel token $v_{1,i}$ were used to estimate the probability that a token in the position of $v_{1,i}$ or further away from the centroid of the distribution V_2 it was compared to was actually sampled from that same distribution. As mentioned above, this was based on the assumption of an underlying chi-square distribution with two or three degrees of freedom. The resulting Mahalanobis-distance-derived probabilities were then subjected to a mixed-effects model analysis with fixed factors style (conversational, citation form) vowel pair (/iː, i/, /aː, a/, /oː, o/), voicing context (pre-voiced, pre-voiceless) and dimensions (two, three); /uː, u/ were excluded from the statistical analysis. Derived probabilities were used instead of raw Mahalanobis distance values, because the main interest of the analysis was not whether the absolute distance between vowel pairs differed significantly but whether the phonemic contrast was significantly affected by any of the fixed factors in the model. The results are listed in table 5.23.

The analysis revealed significant three-way interactions between the fixed factors style, vowel pair and voicing context, and between style, vowel pair and dimensions. Subsequent post-hoc tests showed that the contrast between voicing contexts was significant for the high vowel pair /iː, i/ in the conversational data ($coef = 0.34; chisq = 35.6; p < 0.001$), and it almost reached significance for the low vowel pair /aː, a/in the citation form data ($coef = 0.17; chisq = 6.6; p = 0.050$). The contrast between Mahalanobis-distance-derived probabilities in two and three dimensions was significant for /aː, a/ in the conversational data ($coef = 0.15; chisq = 19.1; p < 0.001$) and for /oː, o/ in the citation form data ($coef = 0.20; chisq = 38.2; p < 0.001$).

Table 5.23: Mixed model analysis results: Mahalanobis-distance-derived probabilities by task (conversational, citation form), vowel pair (/iː, i/, /aː, a/, /oː, o/), voicing context (pre-voiced, pre-voiceless) and dimensions (two, three)

Dependent variable **Significant factors**	**F**	**(df)**	**p-value**	
Mahalanobis-distance-derived probabilities				
style	9.3	(1, 38.7)	< 0.01	**
vowel pair	28.8	(2, 44.4)	< 0.001	***
voicing context	4.8	(1, 30.4)	< 0.05	*
dimensions	28.5	(1, 38.4)	< 0.001	***
style : voicing context	4.3	(1, 48.2)	< 0.05	*
vowel pair : dimensions	11.8	(2, 49.8)	< 0.001	***
style : vowel pair : voicing context	7.1	(2, 64.1)	< 0.01	**
style : vowel pair : dimensions	7.2	(2, 78.8)	< 0.01	**

For the sake of comparability, table 5.24 lists the mean duration ratios and the results of an analysis using Wassink's (2006) spectral overlap assessment metric (SOAM) to test the overlap of all vowel pairs considered above, disregarding the effects of the following voicing context. The SOAM overlap fractions reflect much of what has been found in the analyses above: /aː, a/ and /oː, o/ are characterised by almost complete spectral overlap, /uː, u/ by almost no spectral overlap, and /iː, i/ shows some spectral overlap in the conversational but not in the citation form data. The phonemic contrast in low and mid-back vowel pairs, thus, seems to depend to a large extent on durational contrasts; however, according to Wassink's (2006) definition, /oː, o/ in three dimensions are still characterised by over 40% and, thus, complete overlap. The duration ratios for those vowel pairs whose phonemic distinction presumably depends the most on temporal contrasts tend to be lower then for those vowel pairs which are already quite distinct spectrally.

Table 5.24: Duration ratios and SOAM analysis results by vowel pair and speech style

Vowel pair	Duration ratio	SOAM 2D	SOAM 3D
Conversational			
/aː, a/	1.32:1	92%	37%
/oː, o/	1.27:1	84%	55%
/iː, i/	1.35:1	46%	27%
/uː, u/	2.01:1	0%	2%
Citation form			
/aː, a/	1.37:1	70%	36%
/oː, o/	1.24:1	92%	67%
/iː, i/	1.52:1	0%	0%
/uː, u/	1.72:1	0%	0%

5.6 Summary

In this section, the overall spectral distribution of monophthongs in conversational and citation form urban BahC and their temporal relations were analysed. In addition, social and contextual variation in low and mid-back vowels were examined in more detail and the relative contribution of (static) spectral and temporal contrasts to the phonemic distinction of pre-specified long/short or tense/lax vowel pairs was assessed. In the following, the main results will be summarised.

The vowel space of the conversational speech of participants recorded in 1997/98 was generally V-shaped, while that of the citation form speech of the 2014 participants may best be described as U-shaped, due to incipient spectral separation of low vowels in the START, BATH, TRAP and PALM lexical sets. The vowel space of conversational speech tended to be centralised relative to that of citation form speech. The following voicing context had an impact on the spectral characteristics of most vowels analysed; where the effect reached significance, it caused lower vowel qualities in pre-voiceless relative to pre-voiced contexts. In the short vowels in KIT and FOOT, pre-voiceless vowels were also characterised by a more back position.

In terms of overall temporal characteristics, pre-voiced vowels tended to be longer than pre-voiceless ones, and vowels in citation form tended to be longer than vowels in conversational speech; however, voicing context and style interacted with each other as well as with lexical set. In both speech styles, pre-voiced vowels were significantly longer than pre-voiceless vowels for all vowel categories except for very short vowels and for START in conversational speech. Citation form vowels were significantly longer than conversational vowels only in pre-voiced contexts, and, again, excluding short vowels in the lexical sets KIT and FOOT. The temporal contrast between longer and shorter vowels was, thus, greatest in pre-voiced citation form tokens and smallest in pre-voiceless contexts.

Focussing on individual contrasts, the vowel in LOT was higher, backer and shorter than that in START, indicating distinct vowel categories in both speech styles. The vowel in STRUT was lower, fronter and shorter than the vowel in LOT, again indicating distinct vowel categories in both speech styles. KIT and FOOT were lower and more central than FLEECE and GOOSE in both speech styles, but the spectral contrast was greater in citation form speech. In general, FOOT was also shorter than GOOSE, while KIT was shorter than FLEECE only in pre-voiced contexts in citation form speech. In conversational speech, pre-voiced FLEECE was relatively short compared to other long vowels and the durational difference to pre-voiced KIT was not significant. The vowels in START and TRAP showed some variation by speech style and voicing context. In spectral terms, START was raised and backed relative to TRAP only in citation form speech, and the spectral contrast between START and TRAP was significantly smaller in conversational than in citation form speech. TRAP was significantly shorter than START in pre-voiceless contexts in both speech styles, but in pre-voiced contexts the durational contrast was only significant in conversational speech.

Within speech styles, only few socially-conditioned differences were found in the low and mid-back vowels. In pre-voiceless contexts, START was generally longer than TRAP. In pre-voiced contexts, START was only longer than TRAP in the speech of female higher-class speakers in the conversational data. In the conversational data, START was neither backed nor raised relative to TRAP, but it was actually found to be slightly lower than TRAP in pre-voiced contexts. In the citation form data, START was raised and backed relative to TRAP for all speakers except lower-class females, who did not distinguish the two vowels spectrally in pre-voiceless contexts. PALM consistently patterned with START, while BATH showed a more complex picture: In terms of durational properties, BATH was similar to START, but in terms of spectral properties, it was generally positioned in-between START and TRAP.

In the acoustic analyses, only non-rhotic tokens of START were used. While r-full pronunciation of START was categorically absent from the conversational data, all speakers in the citation form data showed considerable amounts of rhotic START, except lower-class females. Both lower- and higher-class males produced approximately equal amounts of rhotic and non-rhotic tokens, while higher-class females displayed almost exclusively rhotic START. It has been observed that young female speakers in the American South lead in the change towards increasingly rhotic pronunciation (see section 4.3.2). While it may seem that, in the case of rhotic START, the same applies to the Bahamian context, it is important to point out that the difference between genders was not significant for higher-class speakers. For lower-class speakers, females actually produced significantly fewer rhotic tokens of START (about 10%) than males (about 57%), though the effect of gender may have been confounded by the participants' age, as lower-class females were on average a generation older than lower-class males.

Of the mid-back vowels in THOUGHT, CLOTH and LOT, LOT was consistently lower, fronter and shorter than the others. The spectral and temporal characteristics of THOUGHT and CLOTH were generally equivalent. On average and across all three lexical sets, males produced lower and shorter vowels.

The relative spectral and temporal contribution to phonemic distinctions was analysed for the vowel system of lower-class conversational speech and citation form speech excluding lower-class females. As already indicated by previous analyses, high-front and high-back tense/lax vowel pairs were clearly distinguished by spectral contrasts; they also showed a very high amount of temporal contrast. An exception to this pattern are pre-voiced high-front vowels in conversational speech, which were more similar both spectrally and temporally. Low and mid back vowel pairs were spectrally very close, and temporal contrast may, thus, be crucial to phonemic distinction. Duration ratios, however, were relatively low compared to those found for Jamaican Creole and the classification of those vowel quality subsystems of BahC as primary quantity reliant does not seem justified.

Chapter 6

General discussion

The preceding chapters examined the social, stylistic and contextual variation relevant to the linguistic description of individual monophthongs and diphthongs in the BahC vowel inventory. It was shown that selected phonological contextual factors had the most consistent impact on vowel realisations. In terms of sociolinguistic variation, the stylistic difference between datasets, that is between conversational, map task and citation form data, was generally more extensive than differences conditioned by social class or gender. This was also true for social variation within the conversational data, where the difference between lower- and higher-class speakers tended to be most pronounced. The present chapter now turns to a general discussion of the findings; the results of the individual analyses will be summarised and interpreted in the context of three core themes.

Sections 6.1 will focus primarily on urban Bahamian speech and the variation that may be found within. Although it is impossible to arrive at a definitive solution about the contemporary urban BahC vowel system(s) due to the highly heterogeneous nature of the data of this study, the same heterogeneity offers a wealth of information on maximally disparate vowel realisations found in urban Bahamian speech. Section 6.1.1 will review, detail and discuss the realisation of vowels in the individual lexical sets, taking into account variation along the two sociolinguistic dimensions which showed to have the most noticeable impact: speech style and social class. The main goal of section 6.1.1 then is to distill the variation in vowel realisations into two maximally distinct representations of the urban Bahamian vowel inventory, using the classification scheme provided by John Wells' (1982) standard lexical sets. Section 6.1.2 will consider more explicitly the social significance of the pattern of variation displayed by a number of vocalic variables which were found vary by social class and task-based speech style in the data of this study. In this context, the effect of the speakers' age and gender and of confounding factors, specifically the perceived formality of the recording situations, will be discussed. Findings concerning the spread of rhoticity will be summarised in section 6.1.3. Section 6.2 will zoom in on the individual speaker. Modelled on similar representations in Patrick (1999b, 288, 290) and Hackert (2004, 217), the approximate linguistic and social rankings of individual speakers will be explored both within and across speech styles. For speakers in the conversational dataset, the linguistic rank in terms of the phonological variation analysed in this study will be additionally compared to their rank with respect to variation in standard past tense marking analysed by Hackert (2004). Section 6.3, finally, will turn to a cross-varietal comparison of vowel variants. Selected variants of urban Bahamian speech will be compared to those of related and/or associated varieties, including Bahamian varieties spoken on Abaco, some American mainland varieties and some other Caribbean varieties, with the aim of uncovering and elaborating on synchronic similarities as well as historical affinities.

6.1 System and variation in urban Bahamian speech

6.1.1 Urban Bahamian vowel inventories

The following descriptions discuss the variants that occurred in the different lexical sets in urban Bahamian speech, giving their general distribution across speech styles and social classes (see summary in table 6.1 on page 252).

FLEECE In the citation form data, variation in FLEECE was minimal; it was generally realised as the highest and frontest vowel, and clearly longer in duration than KIT. In the conversational data, FLEECE showed some variation in that the vowel was much shorter than other long vowels in the context of a following voiced consonant, in particular in the speech of the lower social class.

KIT KIT was produced as a short high-to-mid front, somewhat centralised vowel in the citation form data. In the conversational data, realisations of KIT varied in that in pre-voiced contexts, tokens were closer to FLEECE than in pre-voiceless contexts, especially for lower-class speakers. This lead to extensive overlap of FLEECE and KIT in pre-voiced contexts in the conversational speech of the lower social class.

FACE The vowel in FACE was described as monophthongal by both Holm and Shilling (1982) and Wells (1982), similar to its realisation in other Caribbean creoles, but as diphthongal by Childs and Wolfram (2004). The acoustic analysis showed that FACE may be both; it displayed two distinct phonological shapes, depending on the following voicing context. In pre-voiced contexts, FACE was invariably produced as a long, front monophthong, lower than /iː/ but higher then /ɪ/. In pre-voiceless contexts, FACE was typically diphthongal, though it became more monophthongal as speech rate increased and overall vowel duration decreased.

DRESS The vowel in DRESS was produced as a relatively front, mid-high monophthong; it was somewhat lower than KIT and acoustically about equidistant between FLEECE and TRAP. Its realisations in terms of spectral position did not differ significantly in the conversational and citation form speech. In both speech styles, DRESS was also produced as a fairly long vowel, much longer than KIT, its closest neighbour in vowel space.

TRAP TRAP was produced as a low and relatively central vowel. Its spectral position did not differ significantly between different speech styles and social classes. TRAP was relatively long, but compared to other low vowels, it was generally the shortest. In pre-voiced contexts in lower-class conversational speech, the durational difference between TRAP and START was only minimal and did not reach significance.

START In the conversational data, irrespective of social class, the vowel in START was realised as a low and relatively central vowel, close or identical in quality to TRAP. In the citation form data, START was usually raised and backed relative to TRAP; for female lower-class speakers, START and TRAP remained spectrally quite similar. In terms of vowel duration, START was usually longer than TRAP, except in pre-voiced contexts in lower-class conversational speech, where the duration of the vowels in START and TRAP was not significantly different.

PALM The vowel in PALM was relatively rare in the conversational data; its general spectral position was equivalent that of the vowels in TRAP and START. In the citation form data, the spectral position of PALM was equivalent to that in START, that is it was raised and backed relative to TRAP. Auditorily, PALM remained unrounded. Regarding vowel duration, PALM also patterned with START, which may indicate that vowels in START and PALM are merged and instantiate the same phonemic vowel category.

BATH In the conversational data, BATH was spectrally equivalent to the other low vowels in TRAP, START and PALM, and patterned temporally with the vowel in START. In the citation form data, BATH also showed vowel durations equivalent to START/PALM, but was positioned spectrally between central TRAP and raised, backed START/PALM. As BATH patterns temporally consistently with START/PALM, irrespective of speech styles and social classes, and as the existence of three distinct vowel categories sharing such a small spectral space in the low central to back vowel envelop seems unlikely, the vowel in BATH and START/PALM may be considered to instantiate the same phonemic vowel category. In Wells' (1982) terminology, urban Bahamian varieties may be referred to as broad-BATH accents.

THOUGHT The vowel in THOUGHT was realised as a fairly long, mid back vowel, acoustically approximately equidistant between GOOSE and TRAP. Based on auditory assessment, it had a clearly rounded quality. The relative spectral position of THOUGHT did not vary across speech styles and social classes.

CLOTH The vowel in CLOTH was spectrally and temporally equivalent to that in THOUGHT. While the data showed a general tendency for CLOTH to be more extreme than THOUGHT in terms of both the spectral position (i.e. higher and/or backer) and vowel duration (i.e. longer), these differences were not significant. THOUGHT and CLOTH may, thus, be considered to instantiate the same phonemic vowel category. In Wells' (1982) terminology, urban Bahamian varieties may be referred to as broad-CLOTH accents.

LOT In terms of spectral quality, LOT was closely associated with the vowels in THOUGHT/CLOTH and, thus, clearly distinct from the vowels in START/PALM. Auditorily, LOT had a rounded quality. In pre-voiced contexts, LOT was spectrally equivalent to THOUGHT, but it was significantly shorter. In pre-voiceless contexts, LOT was lower and centralised relative to THOUGHT/CLOTH as well as significantly shorter. THOUGHT/CLOTH and LOT may be in what has been referred to as a tense-lax relationship. The realisation of LOT did not vary significantly across speech styles and social classes.

STRUT The vowel in STRUT was consistently produced as a fairly short, auditorily unrounded, central to back, mid-open vowel, clearly distinct from LOT. In the conversational data, STRUT was slightly higher and spectrally closer to LOT than in the citation form data, but this stylistic difference was not significant. STRUT was generally extremely short, equivalent in duration to the vowels in KIT and FOOT and much shorter than LOT, except in pre-voiced contexts in the citation form data; in these contexts, STRUT was longer than KIT and FOOT, but still shorter than all other vowels analysed.

GOOSE The vowel in GOOSE was consistently realised as an auditorily rounded, high back vowel. For all speakers, it was on average the most back vowel, showing no signs of fronting. Vowel duration in GOOSE was distinctly longer than in its often associated lax counterpart FOOT.

FOOT The FOOT vowel was very short and relatively low and central – clearly distinct in both quality and quantity from GOOSE. The spectral difference between FOOT and GOOSE was even greater in citation form than in conversational speech.

GOAT As in FACE, the vowel in GOAT was described as monophthongal by both Holm and Shilling (1982) and Wells (1982), but as diphthongal by Childs and Wolfram (2004). In contrast to FACE, the acoustic analysis of GOAT showed significant stylistic variation. In conversational speech, GOAT was invariably produced as a long, back monophthong, lower than /uː/ but higher then /ɔː/. In map task speech, diphthongal GOAT showed the same distribution as diphthongal FACE: Diphthongal GOAT occurred exclusively in pre-voiceless contexts, and the extent of diphthongisation increased as vowel duration increased; in pre-voiced contexts, GOAT was monophthongal. In citation form speech, GOAT was fairly monophthongal in pre-voiced and diphthongal in pre-voiceless contexts; the extent of diphthongisation in pre-voiceless contexts did not depend significantly on vowel duration.

MOUTH The vowel in MOUTH showed an extensive voicing-conditioned allophony, present in all speech styles and social classes but more salient in more informal and lower-class speech. In pre-voiceless contexts, both nucleus and glide were raised and peripheralised relative to pre-voiced contexts. In the citation form data, raising and peripheralisation in pre-voiceless tokens was only significant in the glide, and MOUTH in both voicing contexts was therefore realised as a fairly wide diphthong starting with a low and central vowel quality close to [a] and gliding towards [u]. In the conversational data, the realisation of MOUTH varied by social class: Pre-voiceless nuclei were considerably and significantly higher in lower-class than in higher-class speech, raised to approximately mid-height. For some speakers, the glide in pre-voiced contexts was weakened to the extent that monophthongal variants of MOUTH close to [a] were produced, but this phenomenon occurred in speakers of both social classes. In map task speech, the difference conditioned by the following voicing context was significant in both nucleus and glide. The distribution of raised and non-raised variants of MOUTH is adequately described by the phonological rules that define pre-voiceless raising, often referred to as Canadian Raising.

PRICE The vowel in PRICE, like in MOUTH, also showed a significant voicing-conditioned allophony in all speech styles and social classes: Nuclei were higher in pre-voiceless than in pre-voiced contexts, and glides were weakened in pre-voiced relative to pre-voiceless contexts. The voicing-conditioned difference in nucleus and glide position was approximately equal so that the overall extent of gliding movement remained fairly stable. As in MOUTH, the distribution of raised and non-raised variants in PRICE follows the rules that define the phenomenon known as Canadian Raising. However, in contrast to MOUTH, the effect of the following voicing context varied only minimally by speech style and there were no significant differences between lower- and higher-class speakers.

CHOICE CHOICE was produced as a fairly wide diphthong with a mid back, auditorily rounded starting-point close to [ɔ], gliding towards a somewhat higher and front vowel quality, approximately [ɪ]. Across speech styles, CHOICE mainly varied with respect to overall gliding movement: In citation form speech, the nuclei and glides had more extreme spectral positions, i.e. nuclei tended to be more back and glides tended to be closer to FLEECE than in more informal speech styles.

NURSE The variable realisation of non-rhotic NURSE as a more monophthongal or diphthongal vowel showed both stylistic and social variation, but it was also sensitive to the place of articulation of the preceding consonant. In general, non-rhotic NURSE was most diphthongal and closest in quality to CHOICE in post-labial contexts in lower-class conversational speech. The most consistent difference between social classes in the conversational data was that for higher-class speakers, the glide in NURSE was more central than that in CHOICE, while they were not significantly different for lower-class speakers. Depending on the preceding consonantal context, the nucleus in NURSE was closer to THOUGHT (in post-labial contexts) or more central in quality (in non-post-labial contexts), which, thus, lead to more or less diphthongal realisations of NURSE. Even in post-labial contexts, however, where NURSE was maximally similar to CHOICE, the two vowels were not identical. The nucleus in NURSE was still fronted compared to that in CHOICE, though not always significantly, and it was in almost all cases auditorily unrounded. More importantly, the pattern of spectral change through time from vowel onset to vowel offset in post-labial NURSE indicated extensive formant movement at the beginning of the vowel, a sharp and extended onglide, reaching eventually a relatively late vowel target in the high front vowel space. In contrast, the beginning of CHOICE was characterised by relatively little formant movement, which may be interpreted as a steady-state pattern; maximal formant change towards the high front vowel space then occurred in the mid section of the diphthong. These differences in the temporal pattern of spectral change were generally significant, which could be tested by showing that the temporal midpoint in NURSE was fronted relative to that in CHOICE. Post-labial NURSE, thus, approached realisations of CHOICE in lower-class conversational speech, but the two vowels were not merged. In the map task speech, the same tendencies regarding the social and contextual variation could be observed, but the overall extent of diphthongisation of NURSE was smaller. In the citation form data, higher-class speakers generally produced only rhotic tokens of NURSE and acoustic measures were only available for lower-class speakers. Non-rhotic tokens of NURSE in lower-class citation form speech were relatively monophthongal. NURSE in word-final contexts, that is in words such as *sir* and *purr*, was extremely rare in the conversational and map task data. In the citation form data, word-final NURSE was almost categorically rhotic and, thus, not subjected to acoustic analysis. Emphatic tokens of *her* in the conversational data were auditorily judged to be produced as monophthongal vowels close to [ɐ]. The few non-rhotic tokens that occurred in the citation form data were auditorily judged to be produced as a mid central monophthongs close to [ɜ].

Table 6.1 summarises the lexical incidence of vowel categories in what might be termed the most standard and the most non-standard speech observed in this study. *Standard* is defined here as formal speech and speech used mainly by higher-class speakers, while *non-standard* refers to speech patterns used in more informal situations and normally preferred by lower-class speakers. The terms basilect/mesolect or acrolect were specifically avoided, due to the reliance on primarily stylistic cues in the distinction of the two polar varieties. The IPA symbols in table 6.1 were generally used to represent phonemic categories. Symbols between square brackets indicate considerable context-dependent variation within one phonemic category, or, alternatively, they illustrate vowel quality differences that persist between lexical sets whose associated phonemic categories have been transcribed using the same phonetic symbol. Traditionally, the glides of closing diphthongs have been transcribed with lax vowel symbols /ɪ/ and /ʊ/. The acoustic measurements, however, have shown that, depending on the context, these diphthongs may glide towards the periphery of the vowel space, while /ɪ/ and /ʊ/ tend to be relatively low and central. Hence, these glides are usually transcribed here with tense vowel symbols.

Table 6.1: Lexical incidence of vowels in two polar varieties of urban Bahamian speech

Lexical set	Non-standard	Standard	Lexical set	Non-standard	Standard
FLEECE	iː [i ~ iː]	iː	GOOSE	uː	uː
KIT	ɪ [i ~ ɪ]	ɪ	FOOT	ʊ	ʊ
FACE	eː [eː ~ ei]	eː [eː ~ ei]	GOAT	oː	oː [oː ~ ou]
DRESS	ɛ	ɛ			
TRAP	a	a			
BATH	aː	ɑː [a̠ː]	MOUTH	au [aɔ ~ ɔu]	au [ao ~ au]
START	aː	ɑː	PRICE	ai [aɪ ~ a̝i]	ai [aɪ ~ a̝i]
PALM	aː	ɑː	CHOICE	ɔi [ɔ̟ɪ]	ɔi [ɔi]
THOUGHT	ɔː	ɔː	NURSE	ʌi [ʌɪ ~ əi]	ɜː [ɜː, ɜ˞]
CLOTH	ɔː	ɔː			
LOT	ɔ [ɔ ~ ɔ̈]	ɔ [ɔ ~ ɔ̈]			
STRUT	ʌ	ʌ			

From the summary provided in table 6.1, it becomes clear that differences between the vowel inventories of maximally standard and non-standard urban Bahamian speech concern mainly the phonetic realisation of phonemic categories rather than the total number of phonemic oppositions. While there may occur more extensive overlap between individual phonemic vowel categories in non-standard speech, specifically between FLEECE and KIT, TRAP and BATH/START/PALM, and NURSE and CHOICE, a close analysis of the vowels in different phonological contexts revealed that none of these vowel categories were completely merged. In total, 16 phonemic vowel categories can be identified in both standard and non-standard speech. As lexical sets with potential centring diphthongs, FORCE, NORTH, NEAR, SQUARE and CURE, were not analysed in this study, it is likely that the total number of vowel phonemes in urban Bahamian vowel inventories ranges somewhere between 18 and 21.

A number of diphthongs analysed in this study showed extensive allophonic variation. FACE and GOAT were realised as monophthongs in pre-voiced context, but as variably diphthongal in pre-voiceless contexts. MOUTH was raised in pre-voiceless contexts, and its glide was weakened in pre-voiced contexts, leading to almost monophthongal productions close to [a] for some speakers in the conversational data. These complementary distributed allophonic variants may, to some extent, explain the varied accounts of these vowels found in the literature on BahC. Other context-conditioned variants, in particular those involving the lexical sets NURSE and PRICE, do not seem to be directly reflected in prior impressionistic accounts. NURSE was characterised by a backed nucleus in post-labial context, which resulted in a relatively long trajectory of formant movement and a clearly diphthongal quality close to [ʌi]. Most impressionistic descriptions of BahC vowels cite this diphthongal realisation of NURSE as the primary variant used among creole speakers, with monophthongal productions [ɜ ~ ɜ˞] reserved exclusively for educated speakers of high social standing. In the analyses, however, it was found that the same speakers who produce clearly diphthongal variants in post-labial NURSE may show almost monophthongal productions of non-post-labial NURSE, whereby the nucleus is considerably fronted, leading to realisations close to [ɪi]. PRICE, finally, has been described previously as a relatively standard, wide diphthong with a low starting-point and a high, front offglide, which may be involved in pre-voiced glide weakening to the extent that monophthongal variants may occur. This allophonic distribution could not be substantiated. While PRICE did show voicing-conditioned allophony in that the diphthong in its entirety tended to be higher and more peripheral before voiceless than before voiced consonants, the overall amount of gliding movement remained fairly stable.

With respect to the relative role that spectral and temporal characteristics play in marking phonological contrasts among monophthongs, the analyses showed that the distinction between low and between rounded, non-high back vowels in BahC may depend almost exclusively on differences in vowel length. The duration ratios of vowels in predetermined long-short vowel pairs, however, did not indicate greater durational differences than those that occur in other, dialectal varieties of English. Thus, in concluding, it may be noted that vowel qualities of low and non-high back monophthongs cluster more closely around a low central and a mid back position in F1×F2 formant space than is usually the case in British or American varieties of English, but the designation of 'primary quantity' to the BahC vowel system or to any of its subsystems does not seem justified.

6.1.2 Social variation and diagnostic vocalic variables

The vocalic variables which showed the most extensive sociolinguistic variation were instantiated in the lexical sets START/PALM, GOAT, MOUTH and NURSE. The different variants of these vowel categories may be considered socially diagnostic or, in Irvine's (2008) terminology, load-bearing, indexical of standard versus non-standard urban Bahamian speech.

The vowels in START/PALM and TRAP were spectrally differentiated only in citation form speech, not in conversational speech. While this may be attributed to stylistic variation, it could also indicate language change. In the conversational data, which was recorded in the late 1990s, the spectral quality of the low vowels START/PALM and TRAP greatly overlapped, irrespective of the speakers' social class. The citation form data was recorded in 2014, almost twenty years later; in it, the vowel in START/PALM was significantly raised and backed relative to TRAP. Interestingly, the speaker group which retained the most extensive overlap between these vowel categories was that of the lower-class females, even though the difference across speakers groups was not significant. These lower-class females, however, did not only differ from other speakers in social class and gender, but they were also the oldest speaker group; they were, on average, a generation older than all other participants. From an apparent-time perspective, the variation found in the citation form data may, thus, support the interpretation of language change towards a greater spectral differentiation of low vowels. As no data was available on START/PALM and TRAP in map task speech, that is on the contemporary realisation of low vowels in more informal speech, no definitive case can be made for either language change in progress or persistent synchronic variation.

On the surface, variation in FACE and GOAT regarding monophthongal versus diphthongal realisations patterned quite similarly: Monophthongal variants predominated in pre-voiced contexts, while diphthongal variants could be found pre-voiceless contexts. Across speech styles, both FACE and GOAT showed on average more extensive gliding movement in pre-voiceless contexts in more formal styles. A closer examination, however, showed that realisations of pre-voiceless FACE did not differ significantly across speech styles, if the added effect of vowel duration was taken into consideration: Speakers produced less gliding movement in shorter vowels, and more gliding movement in longer vowels, irrespective of speech style. Diphthongal FACE in pre-voiceless contexts was, thus, neither socially nor stylistically diagnostic. In contrast, diphthongisation in pre-voiceless GOAT did vary stylistically: In the conversational data, GOAT was relatively monophthongal throughout; in the map task data, gliding movement in pre-voiceless GOAT increased with vowel duration; and in citation form speech, pre-voiceless GOAT was clearly diphthongal, irrespective of vowel duration. Therefore, to a small but significant degree, diphthongal pre-voiceless GOAT may be considered a load-bearing variable of standard urban Bahamian speech or, vice versa, monophthongal GOAT may be indexical of non-standard speech. In urban Bahamian speech, no downgliding variants of either FACE or GOAT were produced, and variation centred on monophthongal versus upgliding variants. The apparent functional difference between FACE and GOAT as markers of different language forms, however, seems to parallel previous observations on Jamaican varieties, where downgliding variants of GOAT were found to be more stigmatised than downgliding variants of FACE (Wassink, 2001; Irvine, 2008).

Similar to FACE and GOAT, the realisation and contextual variation in PRICE and MOUTH initially appeared to be very similar: Variants before voiceless consonants were raised relative to those before voiced consonants or in word-final position; this distribution pattern is compatible with the phonological rules that describe the phenomenon often referred to as Canadian Raising. In terms of sociolinguistic variation, however, PRICE and MOUTH patterned very differently. The difference between pre-voiced and pre-voiceless PRICE was significant, but whether the allophony was perceptually salient remained unclear, as none of the participants commented on it. Even if it was, however, it did not seem to be exploited as a sociolinguistic marker, because the differentiation between the voicing contexts remained stable across different speech styles and socially defined speaker groups. In contrast, pre-voiceless raising in MOUTH was clearly stigmatised and associated with non-standard local language use. Participants overtly commented on the feature and the extent of raising showed sharp stylistic stratification. In the conversational data, extensively raised tokens predominated in the productions of lower-class speakers. In the map task data, the difference between social classes was not significant, as extremely raised tokens were also found in the speech of two higher-class speakers in particular, Ben03 and Beth03. In citation form speech, raised tokens were avoided by all speakers. The perceptually salient and socially diagnostic voicing-conditioned allophony in MOUTH may be considered a load-bearing variable in the urban Bahamian context, with raised variants indexical of non-standard speech.

Finally, the realisation of NURSE as a monophthong or as a diphthong close to CHOICE showed social as well as stylistic variation. Only non-rhotic tokens of NURSE were subjected to acoustic analysis, which may have lead to more conservative estimates of the stylistic variation involved in NURSE, because higher-class speakers in the 2014 recordings produced predominantly rhotic tokens; for more on rhoticity see section 6.1.3 below. It was found that, especially in post-labial contexts, NURSE was characterised by a long onglide. In lower-class speech in the conversational data, the glide in NURSE was as peripheral as that in CHOICE so that the overall extent of spectral movement in NURSE was largely equivalent to that in CHOICE. However, as the vowels generally showed a different spectral pattern through time, they were not completely merged. Overall gliding movement was smaller in higher-class speech and in more formal speech styles, where NURSE was realised as a fairly monophthongal, mid central vowel. Therefore, as Donnelly (1997, 23) pointed out, the front- and upgliding diphthong in NURSE is indeed a "true marker" of BahC. It is perceptually salient, and may be considered a load-bearing variable, with diphthongal variants indexing non-standard urban Bahamian speech.

The above variables were mainly discussed in terms of variation along the dimensions of style and social class. In general, it was found that stylistic variation tended to be more extensive and more consistent than social variation, especially in the map task and citation form data, that is in the data recorded in 2014. It is usually the case that in citation form speech speakers of all social backgrounds tend to produce vowel variants that are maximally close to what is perceived as the local standard. So long as all participants have essentially the same knowledge of standard norms and the ability to approach standard-near forms of pronunciation, it follows that socially-conditioned differences in citation form speech would be minimal. Obviously, the map task setting in general, while offering the opportunity to record peer-group interactions, cannot be considered as informal a setting as that achieved by extended conversations centred around topics chosen by participants themselves and involving their personal lives. Crucially, however, it is possible that the map task setting may have been perceived as more formal by lower-class than higher-class speakers, and productions of the two speaker groups may therefore have been more similar than would have been the case otherwise. Higher-class speakers in the 2014 recordings consisted exclusively of students of the College of The Bahamas, which would have been familiar with working with texts and written materials and with performance in test situations more generally. Care was taken to counteract an atmosphere of formal examination, but some lower-class participants, especially the older female speakers, still appeared to be initially somewhat intimidated or confused. Some asked for more explicit guidance at the beginning of the map task, while others reminded their respective map task partners to focus and work through the task more diligently. The student participants did not approach the map task with the same degree of self-consciousness. In fact, they usually appeared to enjoy the task; they tended to be visibly amused by the drawings on the maps and frequently started quarrelling and teasing each other. These differences in the perceived formality of the speech situation may well have affected the participants' patterns of pronunciation, leading to a relatively close approximation of the phonetic realisation of vowels by higher- and lower-class speakers.

One of the aims of this study was to test the effect of (biological) speaker gender on the realisation of vowels across different speech styles. The findings may help to through light on the question whether variation by gender in urban BahC follows the supposedly typical Western pattern, namely that women tend to be the more standard-conscious speakers, or whether men and women in this creole-speaking society essentially talk alike. The results of the analyses in this study showed that differences between the genders were rarely significant. The most obvious differences between genders were found with respect to variably rhotic pronunciations of NURSE and START, which will be discussed in the next section. In terms of gender differences in the realisation of vowels, it was found that non-standard diphthongisation of NURSE in conversational speech was more extensive in lower-class males than lower-class females, which would indeed indicate a more standard-leaning behaviour in women. This was, however, the only clear case of a preference for non-standard vocalic variants by male speakers. Compared to female speakers, male speakers showed a significantly greater stylistic shift from more monophthongal pre-voiceless FACE in map task speech to more diphthongal pre-voiceless FACE in citation form speech. More active style shifters are usually ascribed a greater sensitivity to linguistic norms, but in the case of FACE it is difficult to interpret the observed gender differences as indicating that male speakers rely to a greater extent on symbolic capital in marking their social status, because FACE did not show significant stylistic variation when vowel duration was taken into consideration. In pre-voiceless contexts, the spectral difference between START and TRAP was not significant in the high-low dimension for lower-class females, while it was significant for other speakers group, including lower-class males. However, it is again doubtful whether these findings imply that male speakers tend to use more standard forms than female speakers, because the gender difference was confounded by a difference in age – lower-class females were on average 20 years older than lower-class males. Other significant differences between the genders involved the lexical sets PRICE, where males in the conversational data produced overall higher and/or more peripheral tokens in both pre-voiced and pre-voiceless contexts, and THOUGHT/CLOTH and LOT, where males in the citation form data produced on average lower and shorter vowels. The variants used by male and female speakers in these contexts cannot be clearly located on a standard-to-non-standard continuum.

In general, it transpired that where there were significant differences across genders, these could not be consistently accounted for by women's allegedly more prestige-conscious linguistic behaviour. As Hackert (2004) argued, who found gender differences in urban BahC to be negligible with respect to rates of standard past inflection, her identity as a young, white, female fieldworker may have had a varied impact on the linguistic behaviour of male as opposed to female speakers. Whereas female participants seemed very relaxed in her presence, male participants "were always eager to impress" (215), which may have caused greater accommodation on their part to standard-near speech. Some of my own experiences during fieldwork point in a similar direction. Especially lower-class males of my own age indicated they would be interested in striking up a more intimate relationship. A greater accommodation by male speakers to the standard-near productions of the fieldworker would presumably have confounded their tendency, if it indeed existed, to use more non-standard forms than female speakers. Alternatively, the absence of a clear and consistent linguistic gender differentiation regarding the realisation of vowels in urban Bahamian speech may indicate that the pattern of variation established for Western societies does not apply in the Bahamian context; or if it does, it may not be instantiated in the phonetics and phonology of the urban Bahamian vowel system.

6.1.3 Rhoticity

The variably rhotic pronunciation of NURSE and START was analysed auditorily in terms of the presence or absence of an r-coloured quality in the vowel in NURSE and the presence or absence of coda /r/ following the vowel in START. For convenience, the results for the map task and citation form data are presented once more in table 6.2 below.

Table 6.2: Proportion of rhotic tokens in the map task and citation form data by social class and gender

Speech style	Social class	Gender	NURSE	START
Map task	Lower-class	Female	3%	not available
		Male	60%	–
	Higher-class	Female	82%	–
		Male	96%	–
Citation form	Lower-class	Female	43%	10%
		Male	71%	57%
	Higher-class	Female	98%	92%
		Male	97%	56%

Rhotic pronunciation of START was categorically absent in the conversational data recorded in 1997/98; only two rhotic tokens of NURSE were produced, both of which were found in the speech of Mrs Smith, an educated middle-class speaker. The sharp increase in rhotic tokens of NURSE in the map task data of 2014, with even higher rates of rhoticity in the citation form data, suggests that a change in standard norms towards rhotic pronunciation has taken place within the last 20 years. Tokens of START in the 2014 recordings were only available for citation form speech, but they also indicated a drastic increase in rhotic pronunciation. Further support for this hypothesis comes from the comparatively low rates of rhotic tokens in both NURSE and START in the speech of lower-class females, who were a generation older than other participants and, thus, their productions may reflect earlier pronunciation norms.

At least in part, the high rates of rhotic tokens in the map task and citation form data may be attributed to spelling pronunciation. However, the distribution of rhotic variants in the 2014 recordings showed extensive social and stylistic variation as well as variation by lexical set, which indicates that spelling pronunciation cannot be the only reason for the abrupt rise in rhoticity. Rhotic pronunciation of NURSE was clearly the norm for higher-class speakers of both genders and in both map task and citation form speech, though females showed slightly more non-rhotic tokens than males in the map task data. As already mentioned above, lower-class females showed the lowest rates of rhotic tokens of NURSE – in map task speech, their realisation of NURSE was almost categorically non-rhotic. Lower-class males produced rates of rhotic tokens of NURSE in-between those of lower-class females and those of higher-class speakers.

In sociolinguistic analyses of the shift from non-rhotic to rhotic pronunciation in black and white speech in the American South, it has been observed that rhotic tokens first occurred in stressed syllabic position, i.e. in NURSE, and that the spread of rhoticity reached other contexts, such as START, only later. The use of rhotic tokens in citation form NURSE and START in this study showed the same distribution: Rhotic NURSE was more commonly used than rhotic START. The difference between the use of rhotic tokens of NURSE and START was greatest in higher-class males, who produced almost exclusively rhotic tokens in NURSE, but only about half of all tokens of START were rhotic. Higher-class females produced predominantly rhotic tokens in both NURSE and START, which again parallels previous findings from studies on rhoticity in the American South, where it was observed that young females lead in the change towards greater rhoticity. The distribution of rhotic variants across time, speech styles, social classes, genders and lexical sets all suggest that rhoticity may be spreading in the Bahamian context, presumably due to the influence of the pan-American standard.

6.2 Focus on the individual

The preceding sections have examined the realisation of vowels in urban Bahamian speech from a macro-perspective, focussing on the effect of internal factors and on aspects of variability that can be captured by social and stylistic factors. However, the external factors were not able to fully account for the variability displayed in the data, providing only very coarse divisions of speakers into predefined groups. The present section now turns to the linguistic behaviour of the individual language user.

For the sake of comparability, the linguistic performance and social status of individual speakers were modelled in an arrangement similar to that found in Patrick (1999b, 237-292) and Hackert (2004, 217-219): The overall status ranking of speakers, derived from Gordon's (1987) hierarchical classification scheme, was directly related to their linguistic performance, condensed into an overall linguistic ranking. Calculating the overall linguistic rank of speakers necessarily involved reduction of information and a modelling of speakers' language use in one dimension only. The sociolinguistic variables used in this procedure were chosen carefully in order to ensure maximal interpretability of the outcome. The top and bottom ranks on the linguistic scale were designed to represent maximally standard and non-standard language use; that is, only those variables were selected which varied by speech style while also showing the potential to stratify the sample of speakers within different speech styles. In addition, data on the realisation of these variables had to be available for all speakers and all speech styles. Eventually, two variables were selected, satisfying all criteria: (ʌu), which refers to the variable raising of the nucleus in pre-voiceless MOUTH, and (ʌi), which refers to the variable diphthongisation of post-labial NURSE. As has been demonstrated in this study, both (ʌu) and (ʌi) are socially diagnostic in the urban Bahamian speech community and their variants can be clearly located on a standard-to-non-standard continuum. Roughly, (ʌu) ranges from a maximally standard variant with a nucleus close to [a] to a non-standard variant with a nucleus close to [ɔ]; (ʌi) ranges from a standard monophthong [ɜ ~ ɜ˞] to a non-standard diphthong approximately [ʌi]. Non-standard variants of both (ʌu) and (ʌi) are highly salient and may be considered stereotypes in the urban Bahamian context. Speakers may react in different ways to the stigmatisation attached to linguistic features and the resulting overall ranking must be interpreted accordingly.

The linguistic ranking average was calculated as follows. In a first step, speakers were rank-ordered separately with respect to (ʌu) and (ʌi). For linguistic ranking by (ʌu), log ratios of the nucleus in pre-voiceless MOUTH were used as calculated in the procedure outlined in section 4.2.4: Lower values indicate that the nucleus is closer to TRAP i.e. more standard, while higher values indicate that the nucleus is closer to GOOSE i.e. more non-standard. For ranking by (ʌi), the extent of gliding movement in post-labial NURSE relative to CHOICE was gauged for each speaker by dividing the mean Euclidean distance between nucleus and glide (i.e. between the time points at 20% and 80% into the vowel) of post-labial NURSE by that of CHOICE. Both rhotic and non-rhotic tokens of NURSE were included in the calculations. A lower NURSE/CHOICE ratio indicates a smaller gliding movement in post-labial NURSE relative to CHOICE i.e. a more standard variant of (ʌi), while higher ratios indicate that gliding movement in post-labial NURSE approaches or even exceeds that in CHOICE. When all speakers were rank-ordered relative to (ʌu) and (ʌi), the overall linguistic ranking, referred to in the following as the ranking average, was defined as the mean of the two component rankings. The (ʌu) and (ʌi) ratios and ranking values for all speakers and speech styles can be found in the appendix A3. In the following, differences concerning the ranking of speakers with respect to (ʌu) and (ʌi) will be considered briefly (see figure 6.1), before the discussion turns to the speakers' linguistic ranking average.

Figure 6.1 illustrates the relative position of all speakers with respect to their location on the rank-ordered scales for the variables (ʌu) and (ʌi), ranging from maximally standard to non-standard variants. If the two variables were perfectly correlated (r=1), all speakers would be located on top of the dashed line. As it is, the ranks of speakers with respect to (ʌu) and (ʌi) are correlated with a coefficient of r=0.64 ($t = 5.7; df = 49; p < 0.001$). In eleven instances, speakers differed in their ranks for (ʌu) and (ʌi) by more than 15 points, marked in bold print in figure 6.1. Where these cases involved higher-class speakers in the map task or citation form data, that is in the data collected in 2014, they ranked as more non-standard in their productions of (ʌu) than of (ʌi). In contrast, Jeanne and MrsSmith, two higher-class speakers in the conversational data collected in 1997/98, ranked as more non-standard in their productions of (ʌi) than of (ʌu). While this might be interpreted as an increase in stigmatisation of diphthongal NURSE over the last twenty years, it is important to note that the pattern is largely caused by and, thus, may reflect the idiosyncratic behaviour of the speakers Beth03 and Ben03, who produced considerably more non-standard variants for (ʌu) than their cohorts in both map task and citation form speech. The speaker who diverges the most from perfect correlation between (ʌi) than of (ʌu) is lower-class speaker Art01, though he does so only in citation form speech. From rank 33 for both variables in map task speech, he shifts towards rank 38 for (ʌu) and rank 1 for (ʌi) in citation form speech, that is his shift towards the standard pronunciation of (ʌi) is more pronounced than for all other speakers. If the four speakers disrupting the pattern of correlation between (ʌi) and (ʌu) the most, that is Art01, Ben03, Beth03 and Jeanne, were removed from the data, the correlation coefficient would rise to r=0.81 ($t = 8.8; df = 42; p < 0.001$).

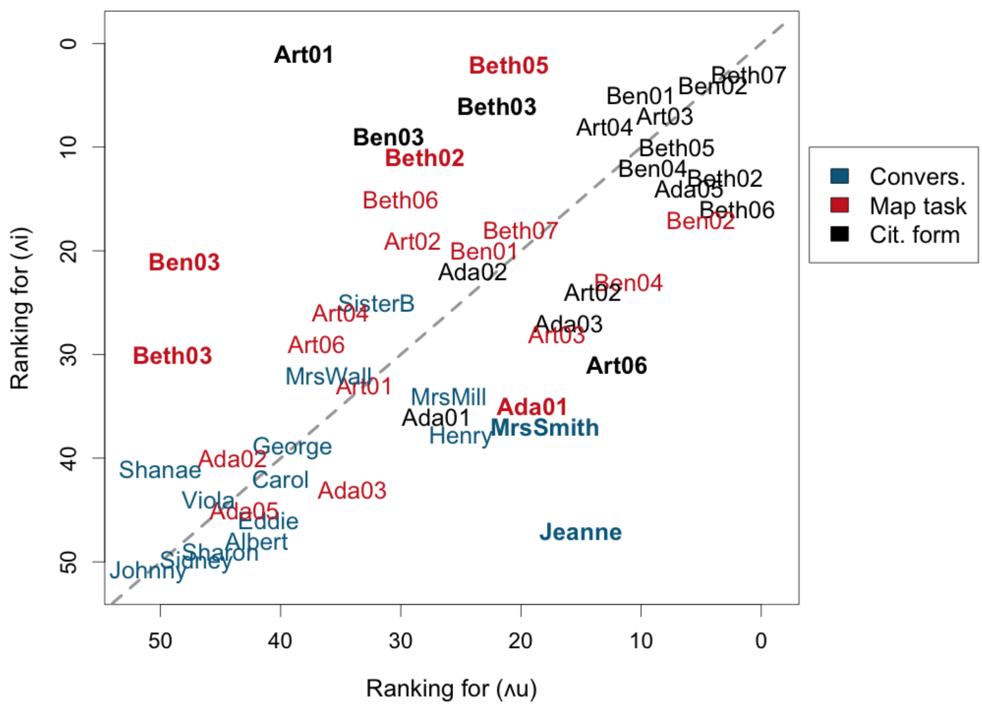

Figure 6.1: Ranking by (ʌu) and (ʌi) for all speakers and speech styles

6.2.1 Across speech styles

Figure 6.2 displays the ranking average for all speakers and speech styles, plotted against the speakers' social status. Most of the speakers follow the expected pattern in that speakers of higher social status and in more formal speech styles generally occupy higher ranks. The linguistically lowest-ranking speakers are working-class speakers in the conversational dataset and the linguistically highest-ranking speakers are middle-class speakers in the citation form dataset. Working on the assumption that the symbolic value of standard English pronunciation is the same for all speakers, it indexes social mobility and status, educational opportunity and formal speech situations. The speakers who most notably disrupt the pattern are Henry (working class) in the conversational data and Beth03 and Ben03 (middle strata) in the map task data, whose linguistic behaviour will be further discussed below.

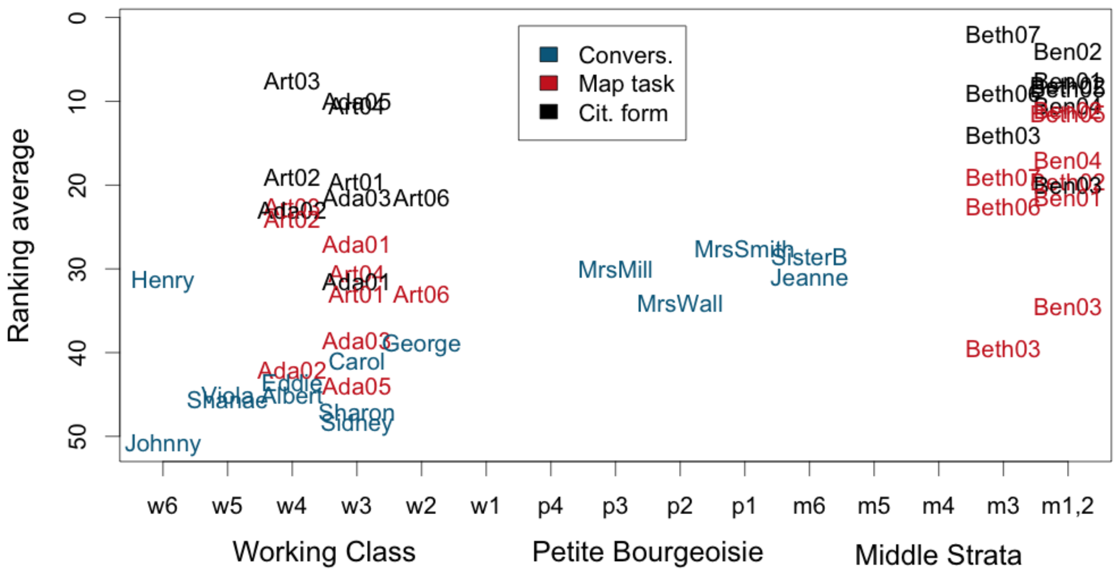

Figure 6.2: Ranking average of all speakers and speech styles by social status

At first glance, there appears to be considerable overlap between working-class speakers in the conversational and the map task data. A closer look, however, reveals that it is only the female speakers Ada02, Ada03 and Ada05 whose ranks are roughly equivalent to those of the working-class speakers in the conversational dataset. As has been mentioned previously, the female working-class speakers in the data collected in 2014 were a generation older than the other participants; their comparatively low ranking averages may, thus, reflect not only their low social standing but also their age. In light of these observations, it is interesting that the fourth working-class female speaker Ada01, who was incidentally the oldest participant in the 2014 data aged 55+, ranked much higher in the map task data than the others. She was also the only speaker whose ranking average was higher, i.e. closer to the standard, in map task than in citation form speech. Ada01 had been a janitress for most of her adult life. She was married to a retired electrician and proud of local customs and of the 'Bahamian Dialect'. While nothing in her social background suggested that she would likely display a more standard-leaning behaviour then her cohorts, her demeanour during the recording session and, in particular, her reaction to the elicitation materials may shed some light on the issue. During the citation form task, that is when reading words in isolation off of cards, she was very talkative and enjoyed imparting knowledge on how words were used locally, often couched in short stories of personal experience. During the recording of the map task, however, she was initially confused as to how to proceed. While she did eventually understand the task requirements, she was never quite as relaxed as she had been for the citation form task. Consequently, Ada01's standard-leaning linguistic behaviour in map task speech compared to other working-class females likely reflects her discomfort with the map task materials and with the task itself.

Table 6.3 compares the linguistic and social ranking of speakers, after the ranking averages were adjusted to the citation form and the map task data separately. As illustrated in figure 6.2, all speakers, except Ada01, shifted towards more standard pronunciations in citation form speech, so a lower ranking in the citation form column compared to the map task column in table 6.3 does not imply a shift towards more non-standard pronunciations, but rather that, compared to other speakers, the shift towards standard norms was less pronounced. Consistent style shifting also indicates that all speakers in the sample were aware of the overt prestige attached to standard English and of its associations with social mobility and status, even though they may subscribe to these social norms to varying degrees. Speaker pseudonyms printed in bold (map task column) or italics (citation form column) in table 6.3 point out sizeable incongruities between the speakers' linguistic and social rankings. Most notably, Ben03 and Beth03, as already mentioned above, showed downward linguistic mobility, that is their linguistic ranking was lower than their social ranking in both map task and citation form speech. Ben03 was a student of electrical

Table 6.3: Ranking of speakers in the map task and citation form data

<table>
<tr><th colspan="5">Linguistic ranking</th><th colspan="2">Social ranking</th></tr>
<tr><th colspan="2">Citation form</th><th colspan="2">Map task</th><th rowspan="2"></th><th rowspan="2">Speaker</th><th rowspan="2">Status</th></tr>
<tr><th>Ranking average</th><th>Speaker</th><th>Ranking average</th><th>Speaker</th></tr>
<tr><td>1.5</td><td>Beth07</td><td>2.5</td><td>Ben02</td><td>1</td><td rowspan="6">Ben02,
Beth05,
Beth02,
Ben04,
Ben01,
Ben03</td><td rowspan="6">MS-1,2</td></tr>
<tr><td>3.5</td><td>Ben02</td><td>3.5</td><td>Beth05</td><td>2</td></tr>
<tr><td rowspan="2">6.5</td><td rowspan="2">Ben01,
Art03</td><td rowspan="2">5.0</td><td rowspan="2">Beth02,
Beth07</td><td>3</td></tr>
<tr><td>4</td></tr>
<tr><td>7.0</td><td>Beth02</td><td>5.5</td><td>Ben04</td><td>5</td></tr>
<tr><td rowspan="2">7.5</td><td rowspan="2">Beth05,
Beth06</td><td>6.5</td><td>Beth06</td><td>6</td></tr>
<tr><td rowspan="2">7.0</td><td rowspan="2">Ben01,
Art03</td><td>7</td><td rowspan="3">Beth07,
Beth06,
Beth03</td><td rowspan="3">MS-3</td></tr>
<tr><td>8.5</td><td>Ada05</td><td>8</td></tr>
<tr><td rowspan="2">9.0</td><td rowspan="2">Art04,
Ben04</td><td>7.5</td><td>Art02</td><td>9</td></tr>
<tr><td>9.5</td><td>Ada01</td><td>10</td><td>Art06</td><td>WC-2</td></tr>
<tr><td rowspan="2">9.5</td><td rowspan="2">Art01,
Beth03</td><td>11.5</td><td>Art04</td><td>11</td><td rowspan="5">Ada01,
Art04,
Art01,
Ada03,
Ada05</td><td rowspan="5">WC-3</td></tr>
<tr><td rowspan="2">12.5</td><td rowspan="2">Ben03,
Art01</td><td>12</td></tr>
<tr><td>12.5</td><td>Ben03</td><td>13</td></tr>
<tr><td rowspan="2">13.5</td><td rowspan="2">Art02,
Art06</td><td>13.0</td><td>Art06</td><td>14</td></tr>
<tr><td>14.5</td><td>Ada03</td><td>15</td></tr>
<tr><td rowspan="2">14.5</td><td rowspan="2">Ada02,
Ada03</td><td>15.5</td><td>Beth03</td><td>16</td><td rowspan="3">Art03,
Art02,
Ada02</td><td rowspan="3">WC-4</td></tr>
<tr><td>16.0</td><td>Ada02</td><td>17</td></tr>
<tr><td>17.0</td><td>Ada01</td><td>16.5</td><td>Ada05</td><td>18</td></tr>
</table>

engineering, and Beth03 studied at the College of The Bahamas School of Nursing. Their plans for the immediate future did not vary conspicuously from those of other students: Beth03 wanted to start working at a local public clinic, preferably the Princess Margaret Hospital, and Ben03 wanted to focus on his studies and one day work as an engineer in Nassau. However, most other students mentioned they had the intention to go abroad after graduation (Ben01, Ben02, Beth05) and/or they had concrete ambitions and social aspirations; for example, Ben01 wanted to be a pilot, Beth02, a student of biochemistry, wanted to be a doctor, Beth05 wanted to be an ambassador, and Beth06 wanted to eventually teach future nurses. In addition, Ben03 and Beth03 were two of only three student participants, the third one being Ben04, who grew up in a working-class home. Both still lived with their parents and noted they had close local family ties. While none of these circumstances are in themselves determinative of the linguistic behaviour of Ben03 and Beth03, a combination of a certain lack of social ambition, having already surpassed the social standing of their parents by being the first generation to go to college, and a strong attachment to Nassau and to local social networks may explain in hindsight their striking adherence to vernacular forms.

Conversely, Art02, Art03 and Ada05 showed upward linguistic mobility in map task and/or citation form speech, that is their linguistic ranking was higher than their social ranking. In the absence of higher education or actual wealth, the symbolic value of standard English may be exploited to pursue or signal social mobility, but, at first, no obvious pattern presents itself which could explain the deviant behaviour of these speakers compared to their cohorts. Art02 was a 23-year-old unskilled technician, Art03 was a 40-year-old porter and Ada05 was a 48-year-old former waitress. However, both Art02 and Art03 revealed that they were somewhat discontent with what they had achieved in life so far. Art02 had claimed to be a technician, but later admitted that he was actually trained as a massage therapist. For about three years, he had been working as a masseur on the beach, offering massages mainly to tourists, before he decided to look for employment elsewhere and was only recently hired by a small local firm to help install air conditioning systems. He hoped that, one day, he might be able to train as a technician. Art03 was initially suspicious of all personal questions and very protective of his image, but during a longer conversation he eventually began to relax. He said he was working as a porter at a small, moderately expensive hotel, but he did not particularly enjoy it. At one time in the past, he had been employed as a record-keeper at a local bank and he desperately wanted to reclaim a position as an office assistant. His lack of training and formal education, however, presented a real obstacle, now that the Nassau job market was flushed with highly educated, young individuals, trained at the College of The Bahamas or at university abroad. Ada05 was not discontent with her situation in life, but she said she was at a turning point. Her husband had just opened a small shop not far from Bay Street and she had subsequently quit her job as a waitress to help launch the business. If everything worked out, she would have achieved her life's ambition, having dreamt about owning a shop since the arrived in Nassau from Cat Island as a teenager. What these three speakers have in common and what sets them apart from other working-class speakers is that they may have felt the need to pursue social mobility via symbolic means. Having not (yet) fulfilled their social aspirations, these speakers utilised standard norms of pronunciation and their association with education and moral authority to signal the position on the social hierarchy they wished to attain.

In this context, it is interesting to note that Ada05 showed by far the most extensive style shift. While she ranked linguistically as the lowest speaker in map task speech, lower than would be predicted from her current social rank, she performed a drastic shift towards more standard-like pronunciations in citation form speech, where she ranked among middle-class speakers with a ranking average of 8.5. Ada05, thus, displayed an especially broad range of linguistic forms, whose use was governed by the standard and non-standard norms she applied to different stylistic contexts. While style shifting may perform a number of social functions and, from a linguistic perspective, enriches a speaker's communicative skill set, extreme style shifting is often considered indicative of linguistic insecurity. When talking to her husband during the map task, Ada05's pronunciation was clearly predominated by non-standard forms. Upon being asked directly, however, she denied her extensive linguistic repertoire, claiming to always use standard English, even when talking to close friends and family. The discrepancy between her reported and recorded language use may indeed indicate a certain degree of insecurity, in line with her pursuit of upward social mobility via symbolic, linguistic means.

6.2.2 Phonological versus morphological variation

Table 6.4 compares the social ranking to the linguistic ranking of speakers in the conversational dataset. Speakers were ranked on two different linguistic scales: The morphological scale ("Past inflection") was derived from the rates of standard past inflection the speakers displayed in chat mode (Hackert, 2004, 185, 217), while the phonological scale ("Pronunciation") was based on the speakers' ranking average with respect to the variables (ʌu) and (ʌi). Speaker pseudonyms printed in bold (pronunciation column) or italics (past inflection column) indicate sizeable incongruities between the speakers' linguistic and social rankings. In contrast to the ranking of speakers in map task and citation speech reviewed in the previous section, the broad distinction between middle-class/petite-bourgeoisie speakers and working-class speakers in the conversational data correlates well with their ranking on both linguistic scales: The speech of higher-class participants is relatively focussed; higher-class speakers occupy the top ranks on the linguistic scales, on which working-class speakers do not generally intrude. A notable exception to this pattern are Henry and Jeanne: Henry ranks lowest among higher-class speakers and Jeanne ranks highest among working-class speakers, though only with respect to pronunciation.

The morphological and phonological scales also coincide regarding the most standard speaker, MrsSmith, and the most non-standard speaker, Johnny. In Hackert (2004, 22), the social background of 70+-year-old MrsSmith is described as unique to the speakers in the sample. While formally she only ranks as PB-1 on the social scale, her upbringing with private tutoring and her life as an artisan and entrepreneur, with active charitable work and occasional travels abroad, clearly reflects elevated social status. Respectability was important to her and she deplored the decline of moral values and community standards. In contrast, linguistically low-ranking speakers, including 25-year-old Johnny, tended to express "disdain for the ideology of social mobility and its association with education" (219). While all other younger speakers received at least some secondary education, Johnny left school at age 14, because, as he claimed, there was not much more the teachers could have taught him. He still lived with his parents, taking on the occasional odd job such as selling peanuts or newspapers as a beach vendor, working at a chicken farm or helping in construction. MrsSmith and Johnny clearly offer different vantage points on Bahamian society in Nassau, and their respective social orientation towards standard- versus

Table 6.4: Ranking of speakers in the conversational data

Linguistic ranking					**Social ranking**	
Past inflection		**Pronunciation**				
Rate [%]	Speaker	Ranking average	Speaker		Speaker	Class
78	MrsSmith	3.0	SisterB, MrsSmith	1	*SisterB*, **Jeanne**	MS-6
63	MrsMill			2		
60	Jeanne	3.5	MrsMill	3	MrsSmith	PB-1
48	MrsWall	4.0	MrsWall, **Henry**	4	MrsWall	PB-2
45	*SisterB*			5	MrsMill	PB-3
41	Sidney	6.0	**Jeanne**	6	*George*	WC-2
36	Carol	6.5	George	7	Carol, ***Sharon***, **Sidney**	WC-3
27	*Shanae*	8.0	Carol	8		
26	*Henry*	9.5	Eddie	9		
21	Albert	10.5	Shanae, Viola	10	Eddie, Albert	WC-4
20	*George*			11		
18	*Sharon*	11.0	Albert	12	*Shanae*, Viola	WC-5
13	Eddie	12.0	**Sharon**	13		
11	Viola	13.5	**Sidney**	14	***Henry***, Johnny	WC-6
10	Johnny	15.0	Johnny	15		

non-standard norms of behaviour is reflected in their use of both morphological and stigmatised phonological forms.

With respect to the individual ranks of speakers other than MrsSmith and Johnny, however, there appears to be extensive variability. In terms of pronunciation, Henry showed considerable upward linguistic mobility, and Jeanne, Sharon and Sidney showed downward mobility. With respect to past inflection, Shanae and Henry showed upward, and SisterB, George and Sharon showed downward mobility. In the absence of first-hand knowledge about the speakers' social circumstances, experiences, expectations and aspirations, it is difficult to determine which aspects in their lives or which characteristics they may have shared, which may have contributed to their linguistic behaviour. As Hackert (2004, 217-219) argued, speakers who presented themselves as linguistically upwardly mobile all sought to display respectability in their interviews, either for pragmatic or for moral reasons, and did so by utilising the symbolic value of standard Enlgish, imbued with moral authority. A number of upwardly mobile speakers pointed out that they would have liked to continue their education past the primary level and some, such as Henry, were taking night classes to achieve this goal. Speakers who showed downward linguistic mobility apparently tended to display themselves "as victims of external circumstances which had thwarted whatever ambitions they had originally had" (219). The phonological data does not contradict Hackert's interpretation; that is, none of the participants was upwardly mobile with respect to pronunciation and downwardly mobile with respect to past inflection – or vice versa. Whenever a speaker's social rank differed drastically from their rank on both the morphological and the phonological scale, the direction of the contrast was the same. Thus, Henry's speech was more standard in terms of both past inflection and pronunciation than would be expected from his social rank, and Sharon's speech was more non-standard.

To sum up, broad divisions of the social and linguistic scales tended to overlap in that higher-class speakers were found at the top of both the morphological and the phonological scale, while working-class speakers generally occupied lower ranks. In addition, on both linguistic scales, MrsSmith and Johnny represented the standard and non-standard poles, respectively. While the rankings of other speakers with respect to past inflection and pronunciation did not always coincide, when speakers showed considerable discrepancies in their social and linguistic rankings for both linguistic scales, they pointed in the same direction; that is speakers showed either upward or downward mobility, but never both.

6.3 Cross-varietal comparison of vowel variants

In table 6.5, the approximate phonetic realisations of selected vowels in urban Bahamian speech ("Black Nassauvian") are compared to a number of related or associated varieties, including black and white Bahamian speech on Abaco, the Caribbean varieties Bajan, Trinidadian Creole and Jamaican Creole, and the American mainland varieties Gullah, African American Vernacular English, and old-fashioned Southern white speech. The latter category specifically focusses on archaic forms of rural white speech which were once typical of east-coast varieties from Tidewater Virginia to Low Country Georgia; this area was once predominated by plantation culture and it is assumed to be the origin of the majority of American loyalists who left for the Bahamas after the American Revolutionary War. The chart relies heavily on the contributions to *A Handbook of Varieties of English* (Schneider et al., 2004), including Blake (2004), Childs and Wolfram (2004), Devonish and Harry (2004), Edwards (2004), Thomas (2004), Weldon (2004), and Youssef and James (2004). In addition, the profiles of vowels found in Kurath and McDavid (1961), Thomas and Bailey (1998), Thomas (2001), and Childs et al. (2003) were consulted. In the individual entries, a comma was used to mark alternative realisations which may be said to correlate with social class, speech style or prestige; in these cases, the right-most variant is the most overtly prestigious and the one preferred by educated speakers of high social status in formal situations. A tilde was used to mark variants whose distributions depend on other, possibly language-internal, factors, or whose social distributions have not been explicitly documented by the respective authors. In the column for “Archaic white Southern” speech, some entries were divided by slashes; these indicate that different variants once predominated in the area ranging from Chesapeake Bay, Tidewater and Piedmont Virginia to Pamlico Sound in North Carolina (right) than in the area centred around the Low Country of South Carolina and Georgia (left). Pre-voiced and pre-voiceless contexts of FACE, GOAT, MOUTH and PRICE were treated separately, due to the extensive voicing-conditioned allophony found in urban Bahamian speech.

In terms of the realisation of low vowels in TRAP, BATH and START, urban BahC patterns with other creoles in the Caribbean. There is a lack of distinction of these vowels in the front-back dimension and they merge spectrally in a low, central quality. Standard-near variants of START in urban Bahamian speech show a tendency to be backed relative to TRAP, which may be attributed to the continued social pressure of exonormative models of standard English of either British or American origin. Throughout the decades following independence from the United Kingdom, the influence of American Standard English has had considerable influence on the anglophone Caribbean region in general. In urban Bahamian standard-near speech, this may be reflected in the increase of rhotic pronunciations of START as well as NURSE. The vowel in BATH, on the other hand, shows longer durations than TRAP, corresponding closely to START, which is commonly the case in varieties of British English including the standard accent RP. Therefore, the identity of urban Bahamian and other Caribbean varieties as broad-BATH accents may indicate continued alignment with British English language use.

Table 6.5: Cross-comparison of the lexical incidence of vowel variants in Bahamian and related or associated varieties

Lexical set	**Bahamian varieties**			**Caribbean varieties**			**American varieties**		
	Black Nassauvian	Black Abaconian	White Abaconian	Bajan	TrinC	JamC	Gullah	AAVE	Archaic white Southern
TRAP	a	a ~ æ	a ~ æ	a	a ~ æ	a ~ ɐ	a ~ æ̞	æɛ	a ~ æ
BATH	aː, aː ~ ɑː	–	–	aː	a(ː)	aː	a ~ æ̞	æɛ	a ~ æ
START	aː, ɑː(r)	ɑ	ɑ	aːr	a(ː)	aː(r)	a	ɑː	ɑ ~ ɒ(ː)
STRUT	ʌ	ɔ	ɔ	ʌ	ɒ ~ ɔ(ː) ~ ʌ	ɵ ~ ɔ	ʌ	ʌ	ʌ ~ ɔ / ʌ
LOT	ɔ ~ ɔ̈	ɑ	ɑ	ɑ ~ ɒ	ɒ ~ ʌ ~ ɔ	a, ɔ	ɒ ~ ɑ	ɑ	ɑ ~ ɒ
FACE-vd	eː	ei	ei	iɛ ~ ɛː, eː ~ ei	e(ː)	ie, eː	e	(eː ~) eɪ	e̞ː ~ e̞ə / ɛi
FACE-vl	eː ~ ei	*same*	*same*	*same*	*same*	*same*	*same*	*same*	*same*
GOAT-vd	oː	ou	ɵü	oː ~ oə	o(ː)	uo, oː	o ~ oɛ	(oː ~) ou	o̞ː ~ o̞ə / ɜu
GOAT-vl	oː, ou	*same*	*same*	*same*	*same*	*same*	*same*	*same*	*same*
NURSE	ʌɪ ~ əi, ɜ ~ ɜ˞	ɜ	ɜ	ɤr	ɔ ~ ʌ ~ ɜ(ː)	o, əːr	ɑ ~ ʌ	ɤ ~ ɜ ~ ɜ˞	ɜɪ, ɜ
CHOICE	ɔɪ	ɔɪ	ɔɪ	ʌɪ ~ oɪ	ɔɪ	ai, ɔi	ɐɪ ~ ɔɪ	ɔɪ ~ oɪ	ɔɪ ~ oɪ ~ oːɛ ~ oːə
MOUTH-vd	aɔ	aɔ ~ ɑɔ	aö ~ aɛ	ʌu ~ ʌʊ	o ~ ɔʊ	ɵʊ ~ aʊ	ɔʊ ~ ɐʊ	aɔ	æɔ ~ æɒ / aɵ ~ aɛ
MOUTH-vl	ɔu, au	*same*	*same*	*same*	*same*	*same*	*same*	*same*	ʌu ~ ɜʉ / *same*
PRICE-vd	aɪ	aː ~ aæ	ɑɛ ~ ɑi	ʌɪ	aɪ	ai	ɐɪ	aː ~ aæ	ɑːe ~ ɒːe
PRICE-vl	a̞i	ai ~ ɑi	ɑi	*same*	*same*	*same*	*same*	aɪ	ɐi / *same*

The vowel in STRUT is backed and rounded in the more radical Caribbean creoles as well as in old-fashioned white speech of the Low Country of South Carolina and Georgia. Today, the most widespread variant of STRUT in American as well as British English accents is a more central and unrounded variant close to [ʌ]; this is also the most prestigious variant in the majority of intermediate creole varieties of the Caribbean. In the Bahamian context, STRUT varies from unrounded [ʌ] in urban black speech to rounded [ɔ] in both black and white speech on Abaco. Due to the presence of both variants in varieties of the Caribbean as well as in associated North American accents, it is difficult to explain the contemporary regional variation within the Bahamas. Childs et al. (2003), who analysed the vowels used by speakers on Abaco, argued that Abaconian varieties were strongly influenced by US mainland varieties, because the loyalists who arrived in 1783 found the island completely empty and, due to its isolation, Abaco inhabitants rarely participated in mainstream Bahamian life. In addition, they claimed that black Bahamian varieties in Nassau tend to be "a bit more vernacular" (10) than those of Abaco. Taken together, the information available on STRUT at present points towards a greater affinity of Bahamian varieties with American mainland varieties, as the most non-standard variant of STRUT is not rounded, while rounded variants may be attributed to the influence of archaic US dialects.

LOT is invariably produced as a mid, fairly back and rounded vowel in urban Bahamian speech, spectrally close to THOUGHT. In other Caribbean varieties, basilectal variants of LOT may be produced as lower, centralised and unrounded, but the most prestigious forms in the Caribbean context in general typically involve lip-rounding, a pronunciation clearly distinct from LOT in most North American varieties, where the vowel is roughly realised as [ɑ]. In the Bahamian varieties spoken on Abaco, LOT is apparently produced as a backed and unrounded vowel in both black and white speech, that is the spectral qualities of LOT and THOUGHT are not identical. Childs and Wolfram (2004, 440-441) argued that this pattern corresponds closely to pronunciations of LOT in AAVE and in Southern white US speech, especially in the Pamlico Sound area. It, thus, seems that with respect to LOT the Bahamas constitute the borderland between American and Caribbean regional variants.

Throughout the Caribbean region, monophthongal variants in both FACE and GOAT are generally the default pronunciation, with down- or ingliding variants found in more basilectal speech. In Bajan, upgliding variants are described as a fairly new phenomenon which only occurs in educated speech. The vowels in FACE and GOAT display some variability in the Bahamian context. In Abaconian speech, upgliding diphthongs are apparently the most common variants for all speakers, irrespective of ethnicity, social class or linguistic context. In urban Bahamian speech, exclusively monophthongal variants were found in pre-voiced contexts, while diphthongal variants occurred variably in pre-voiceless contexts. At first glance, it would seem that the Bahamas again represent the linguistic borderland between the American and Caribbean region. Crucially, however, although Caribbean variants of FACE and GOAT were in the past and remain predominantly monophthongal, it is not the case that variants in all American accents were always diphthongal. As was discussed in section 4.1.2, monophthongisation of FACE and GOAT occurs in many varieties of English characterised by language contact situations. In fact, all American mainland varieties listed in table 6.5 have or once had monophthongal variants; in AAVE, monophthongal FACE and GOAT were the norm in the late 19th and early 20th century, while monophthongal variants in Southern white speech were once fairly common in areas predominated by plantation culture such as the Low Country of South Carolina and Georgia. Consequently, the realisation of FACE and GOAT as monophthongs in the Bahamian context does not necessarily imply historical or indeed social affinity with other Caribbean varieties, but reflects a history of language contact, which Bahamian varieties share with both Caribbean as well as American varieties. The voicing-conditioned allophony in FACE and GOAT in contemporary urban Bahamian speech may have developed as the results of reallocation of non-standard monophthongs and standard-like English diphthongs to different contextually defined allophones of the same phonemes during the past decades, when BahC and non-creolised forms of English came into increasingly regular contact with each other. Non-creolised forms of English in this context may refer to Standard British and American English as well as other varieties of predominantly North American English. The relegation of upgliding variants to pre-voiceless contexts may be explained with recourse to the phenomenon of peripheralisation of high offglides before voiceless consonants, which has been observed in a number of English accents and may be a phonetic universal (see section 4.1.2.2).

In contrast to many basilectal varieties of Caribbean creoles and Gullah, Bahamian varieties do not show a fronted and unrounded first element in the diphthong in CHOICE, and CHOICE is not merged with PRICE. In this respect, Bahamian speech is closer to non-creolised varieties of English, but it also shares this relatively standard, wide, back-to-front gliding variant with other intermediate creoles of the Caribbean region such as TrinC. In non-standard urban Bahamian speech, the spectral quality of CHOICE may be close to that of NURSE, as NURSE is variably produced as a high- and front-gliding diphthong with a central or back, unrounded starting-point. While diphthongal NURSE is, thus, typical of urban BahC, it is conspicuously absent from other Caribbean creoles and from varieties of English spoken in the British Isles. In section 4.3.3, the occurrence of upgliding NURSE in a number of mostly archaic North American mainland varieties was reviewed and, as indicated in table 6.5, a diphthongal variant close to [ɜɪ] also once predominated in white working-class speech in those Southern US east-coast areas from where the majority of British loyalists hailed who came to the Bahamas after the American Revolutionary War. It seems that BahC likely inherited the speech variant via its strong linguistic connection to the Carolinas and Georgia. Whether diphthongal NURSE was in common use in Gullah at the time it was imported into the Bahamas is unclear. Weldon (2004, 196) described NURSE as a low, back, unrounded monophthong [ɑ] in contemporary Gullah. Turner (2002, 20), originally published in 1949, used the symbol [ʌ] to transcribe the vowel in words such as *bird* and *earth*. The only available source indicating that NURSE in Gullah may be, or may at one time have been, produced as a diphthong similar to the one found in BahC is Holm (1983, 310), who cited personal communication with William A. Stewart. If diphthongal NURSE once indeed predominated in Gullah, it must have disappeared in Gullah before it did so in the speech of white speakers in South Carolina and Georgia, as Turner (2002) would have otherwise mentioned this very noticeable feature. Alternatively, BahC speakers could have inherited the diphthongal variant from white immigrants to the Bahamas, in which case, however, it is curious that it is found today only in the speech of black but not of white Bahamians (Childs and Wolfram, 2004, 439), and only in Nassau but not on Abaco. Today, the diphthong in NURSE in urban Bahamian speech is socially stigmatised, its use relegated to informal contexts of language use. In addition, rhotic pronunciation encroaches on Bahamian productions of NURSE, presumably due to the strong influence of the pan-American standard, and indeed the majority of tokens of NURSE produced by the student participants in this study were rhotic and fairly monophthongal.

The realisations of the vowels in MOUTH and PRICE in the Bahamian context show considerable regional, social, ethnic, and contextual variation, as is summarised in table 6.5. From a necessarily synchronic perspective, it is difficult to explain the varying pronunciation norms in Bahamian speech. Childs et al. (2003) attribute the fronted offglides in MOUTH in the speech of white Abaconians to the persistent influence of the productions of white immigrants from originally the Pamlico Sound area, who set foot in the Bahamas after American independence. Glide-weakening in pre-voiced PRICE in Abaconian speech is likely a relatively new phenomenon, possibly spreading from black and white Southern US varieties to the neighbouring Bahamas. Canadian Raising in urban Bahamian varieties could have been transported to the Bahamas by white loyalists from the Low Country of South Carolina and Georgia, that is from areas where pre-voiceless raising has been documented in, meanwhile archaic, white settler dialects (see table 6.5). It is unclear how patterns predominating in white speech could have affected primarily mesolectal forms of BahC. However, Canadian Raising could have been the preferred pattern in Bahamian speech more generally, and upwardly mobile speakers could have gradually adapted their pronunciation to reflect contemporary standard norms throughout the 20th century, as access to and pressure from standard English increased. Alternatively, pre-voiceless raising in MOUTH could be the result of standard English influences on earlier, more basilectal BahC. Non-fronted, raised productions of MOUTH with nuclei in the range of [ʌ ~ ɔ] are common among Caribbean creoles and are also found in Gullah (see table 6.5). Based on the acoustic evidence of a Gullah speaker born in 1844, Bailey and Thomas (1998) showed that this was also an accepted realisation of MOUTH 150 years ago. It seems plausible, then, that when earlier Gullah was transported to the Bahamas about 200 years ago, MOUTH was produced as backed and raised [ɔu] in all contexts. With increased interracial contact, education and access to standard and other non-creolised forms of English throughout the 20th century, an allophonic distribution could have emerged by reallocation as the result of dialect contact, a development similar to what Britain and Trudgill (2005) proposed for pre-voiceless raising in the British Fens. This scenario could also account for the (rare) presence of raised tokens of MOUTH in pre-voiced contexts, some of which were found in lower-class speech in the conversational data. However, both scenarios outlined above are, of course, merely based on speculation. Canadian Raising could have developed independently in the Bahamas as it has in a number of American mainland varieties, starting out as a subtle phonetic process, possibly in the form of Asymmetric Assimilation (see section 4.2.2.3), and evolving into a phonologised distributional pattern with associated social meanings. In the absence of diachronic data, no definite answer can be given at present as to why and how the alternation took root in the urban Bahamian context.

In this section, regionally diagnostic vocalic variants in Bahamian and in selected Caribbean and American mainland varieties were compared and discussed with a view to synchronic similarities and shared processes as well as likely historical connections. While it is premature to draw definite conclusions about the exact roles any of the varieties listed in table 6.5 may have played or still play in shaping the varieties of the Bahamas, some variants do suggest historical and contemporary affinity to black and white American mainland varieties. In cases where urban Bahamian speech patterned with other Caribbean varieties, shared variants could generally be accounted for by a shared historical connection to British English varieties or by a shared history of language contact. Similarities, which seem obvious at first glance, appear to be mostly circumstantial in the sense that they can be attributed to mediating forces shared throughout the Caribbean region rather than to direct contact between the Bahamas and individual Caribbean territories. Therefore, with respect to the realisation of vowels, Bahamian speech reflects a background in creolisation with a British English superstrate, but it is closer to American mainland varieties than to Caribbean varieties.

It has been claimed that the standard variety of the Bahamas "tilts towards the US" (McArthur, 2002, 240) more so than it does in other Commonwealth nations in the Caribbean. This claim cannot be supported by the findings of this study. While it is clear that American standard forms impact on the pronunciation norms in the Bahamas with respect to rhoticity, leading to increasingly rhotic pronunciations by Bahamian speakers, other norms still reflect the British rather than the American standard model. For example, urban Bahamian speech can be described as a broad-BATH accent, and LOT is clearly rounded and quite distinct from the vowel in START/PALM. The emerging Bahamian standard model of pronunciation incorporates and combines features of both the British and the American standard, while retaining some typically Bahamian characteristics.

In the preceding paragraphs, it was established that urban Bahamian speech reflects a strong historical connection to American varieties of English, while local standard or near-standard pronunciations cannot be accounted for exclusively by the influence of contemporary forms of American English. These findings, however, must be understood as applying specifically to the urban context, that is to language use in Nassau, New Providence. From table 6.5, it is quite clear that Bahamian varieties spoken on Abaco may differ considerably from those spoken in Nassau. In general, Abaconian varieties seem closer to contemporary American varieties; for example, LOT is unrounded, and PRICE shows pre-voiced glide weakening as is typically found in AAVE and in Southern US white speech. It is quite possible, therefore, that different islands in the Bahamian archipelago, depending on historical settlement patterns as well as contemporary demographics and social structure, reflect North American and Caribbean influences to varying degrees.

Chapter 7

Conclusion

In the introduction, the hope was expressed that this study would prove useful to research in three disciplines: creole studies, sociolinguistics, and phonetics. The work reported here adds to the creolist literature by providing a detailed analysis of the phonetic and phonological structure of vowels in the intermediate creole language spoken in the urban Bahamian context, and how it relates to related and/or associated creolised and non-creolised varieties in North America and in the Caribbean. In terms of the Bahamas' position at the linguistic crossroads of the Americas, the results of this study showed that the urban BahC vowel system reflects a background in creolisation with a British English superstrate, but it is closer to American mainland varieties than to Caribbean varieties.

From a variationist sociolinguistic perspective, this study offers insight into the workings of social and stylistic variation in a creole speech community. In particular, it was demonstrated that, insofar as all speakers can be assumed to have knowledge of standard norms, the distribution of standard and non-standard variants by social class and speech style follows the same general pattern as has been observed for speech communities in which non-creolised non-standard varieties of English are spoken. However, some non-standard variants, which may be referred to as stereotyped, stigmatised, or load-bearing, may display sharp social and stylistic stratification, which is traditionally associated with variation on the level of grammar. In general, stylistic variation tended to be more stable and extensive than variation by social class. Significant variation conditioned by the speakers' gender was rare and did not consistently follow the pattern in Western speech communities whereby female speakers tend to use more standard forms than male speakers. Another finding, which may be of interest to both creolists and sociolinguists, concerns the relative distribution of morphological and stigmatised phonological variables across the same sample of speakers. It was found that the polar varieties were quite focussed and that variation on the two linguistic levels patterned in very similar ways; this indicates that they were likely also evaluated by speakers in very similar ways so that phonological variables have in principle the same potential to index creoleness or non-standardness as grammatical variables.

From the perspective of phonetics, this study offers a first acoustic characterisation of vowels used in urban Bahamian Creole. In addition, the close analysis of voicing-conditioned alternations in the realisation of closing diphthongs also showed that pre-voiceless peripheralisation characterised the productions of all speakers. Moreton and Thomas (2007) interpreted this phenomenon as pre-voiceless hyperarticulation, a possibly universal phonetic process which may underly the development of such voicing-conditioned allophonies as Canadian Raising. This study provided the first evidence of this phonetic process at work in a creolised variety of English.

Because the analyses in this thesis brought together methods from all of these fields, the body of information acquired was quite large. There remains much which may be examined in more detail or from a different perspective at a later time. For example, the conversational transcripts were used only for phonetic analysis of vowels and for the investigation of past marking by Hackert (2004), but they contain a wealth of information which may prove useful in the analysis of discourse patterns or of code-switching and code-mixing behaviour. Likewise, the map task data collected were analysed only with respect to the realisation of vowel segments, but the elicited material may also be profitably used in the prosodic analysis of discourse structure and of other aspects of intonation. In the future, the acoustic production analyses presented here should be complemented by perception experiments to determine which markers of Bahamian speech are the most salient and to shed light on potential sound changes in progress, which were briefly discussed in this thesis. It is hoped that the findings reported here make fruitful contributions to various subdisciplines in the field of linguistics. In particular, it is hoped that they spark research interest in the phonetic analysis of creolised varieties of English, which have been largely ignored in this respect, even though they have a lot to offer.

Appendices

A1 Recording materials

Table A1.1: Complete list of words recorded in citation form, grouped and ordered by lexical set

Lexical set	Words subjected to analysis		Words removed from analysis	
BATH	bath, path, fast, basket	4	dance, plant; cast, calf, castle, can't	6
CHOICE	boys, poison, toys, joys, noise, noisy; Boyce, moist, toy-store, Joyce, choice, foist, hoist; boy, coy, toy, soy	17	–	0
CLOTH	boss, foster, cost	3	moth; coffee	2
DRESS	bed, fed, head; bet, pet	5	Ben, pen, fen	3
FACE	bathe, fade, daisy, gaze, haze; bait, fate, date, gate, hate	10	–	0
FLEECE	bead, feed, heed; beat, feet, heat	6	–	0
FOOT	hood, good; put, foot, book	5	–	0
FORCE	–	0	board, doors; court, hoarse	4
GOAT	bows, toad, toes, code, hose; boat, dote, dose, goat, host	10	–	0
GOOSE	booze, food, who'd; boot, booth, hoot	6	tube, dune, news, suit	4

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(Table A1.1, continued from previous page)

Lexical set	Words subjected to analysis		Words removed from analysis	
KIT	bid, fiddle, hid; bit, fit, hit	6	bin, pin, fin	3
LOT	pod, body, cod; pot, hot, cot	6	bottle	1
MOUTH	powder, loud, thousand, cloud, cloudy, cows, how'd; spouse, mouse, south, doubt, couch, house	13	boughs; louse; pound, sound, down, town	6
NEAR	–	0	beer, pier, fear, hear	4
NORTH	–	0	border, cord; torch, horse	4
NURSE	bird, murder; birth, person, first, dirt, dirty, turtle, shirt, nurse, nursing, church, hurt, curse; purr, stir, sir	17	–	0
PALM	father, spas	2	balm, palm, calm	3
PRICE	pies, died, tide, side, size, guide, hide; bite, dice, tight, sight, slice, kite, height	14	bind, find, pine, fine, time	5
SQUARE	–	0	bear, pear, fair, hair	4
START	bard, bars, hard, card, garden, cars; Bart, part, heart, cart	10	–	0
STRUT	bud, buzz; butt, bus, hut	5	–	0
THOUGHT	paws, laws; bought, fought, caught, talk	6	daughter, haughty, call	3
TRAP	bad, pad, had; bat, fat, hat	6	cad, cat, cab, gas	4
Total types		151		56

1. Speaker code: ____

2. Gender: ☐ Male ☐ Female

3. Age (group): ______ ☐ 18-25 ☐ 26-45 ☐ 46-65 ☐ 66+

4. Place of birth: ☐ Nassau, Bahamas

   ☐ other: ____

   If other: How long have you lived in The Bahamas/Nassau? ________

   Have you lived other places? For how long?

   ____

   Mother's place of birth: ☐ Nassau, Bahamas ☐ other: ______________

   Father's place of birth: ☐ Nassau, Bahamas ☐ other: ______________

   Spouse's place of birth: ☐ Nassau, Bahamas ☐ other: ______________

5. What was the language usually spoken in your home growing up?

   ☐ Bahamian Dialect ☐ both Bahamian Dialect and Standard English

   ☐ Standard English ☐ other: ______________________________________

6. What is the language you now use most with your friends and family?

   ☐ Bahamian Dialect ☐ both Bahamian Dialect and Standard English

   ☐ Standard English ☐ other: ______________________________________

7. Level of schooling:

   ☐ elementary ☐ some secondary ☐ secondary ☐ some tertiary ☐ tertiary

8. Occupation: ____

   Mother's occupation: ______________________________________

   Father's occupation: ______________________________________

   Spouse's occupation: ______________________________________

Figure A1.1: Demographic questionnaire

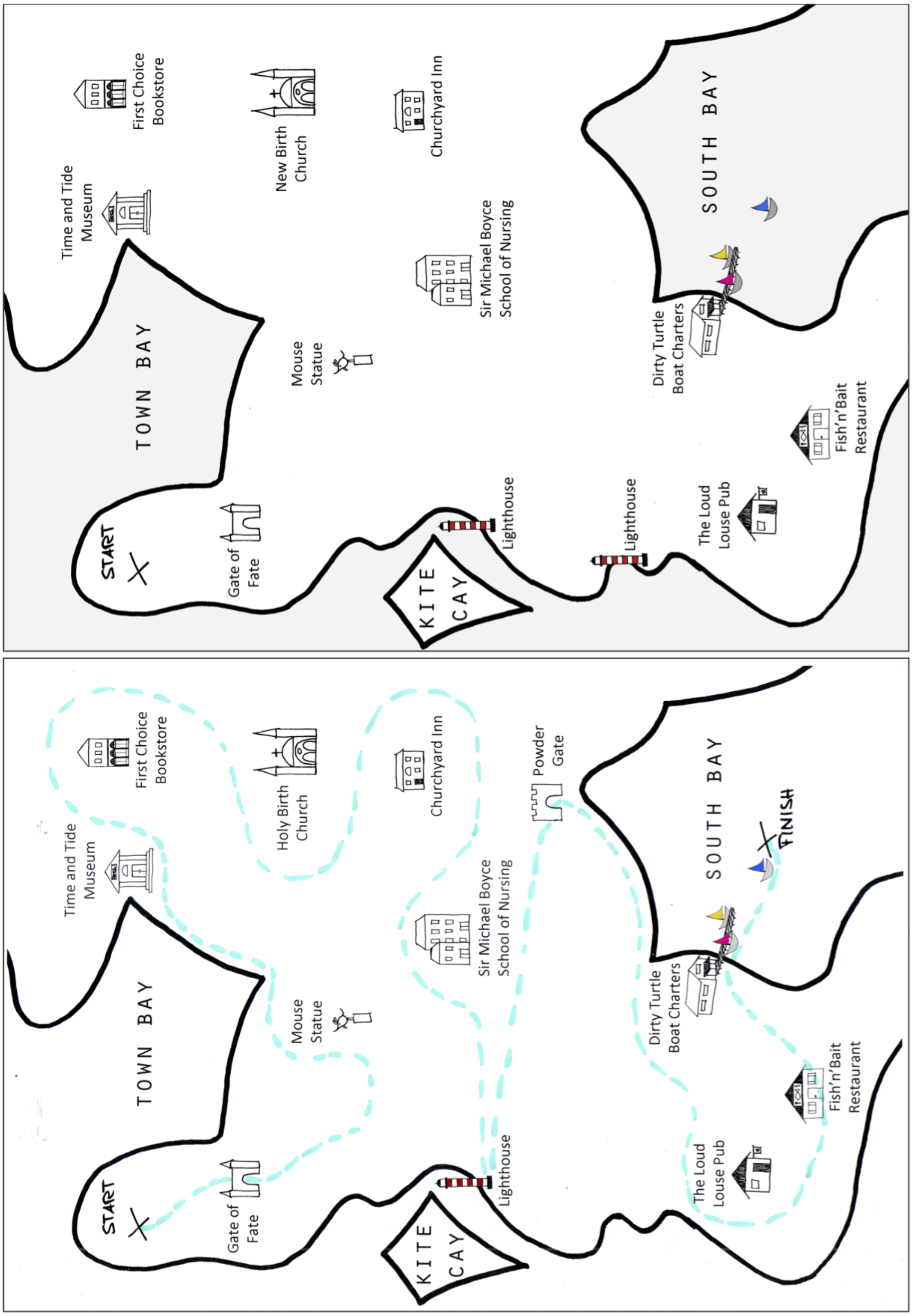
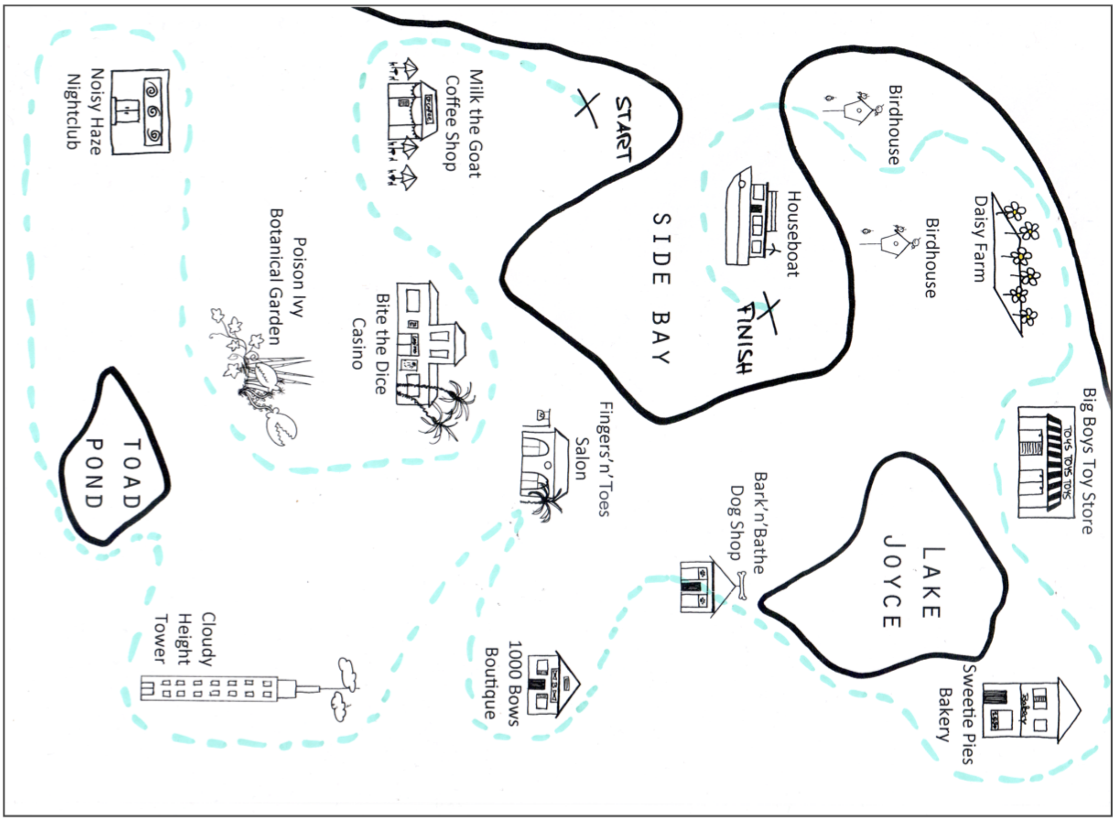


Figure A1.2: Example of map task elicitation materials: Map 1



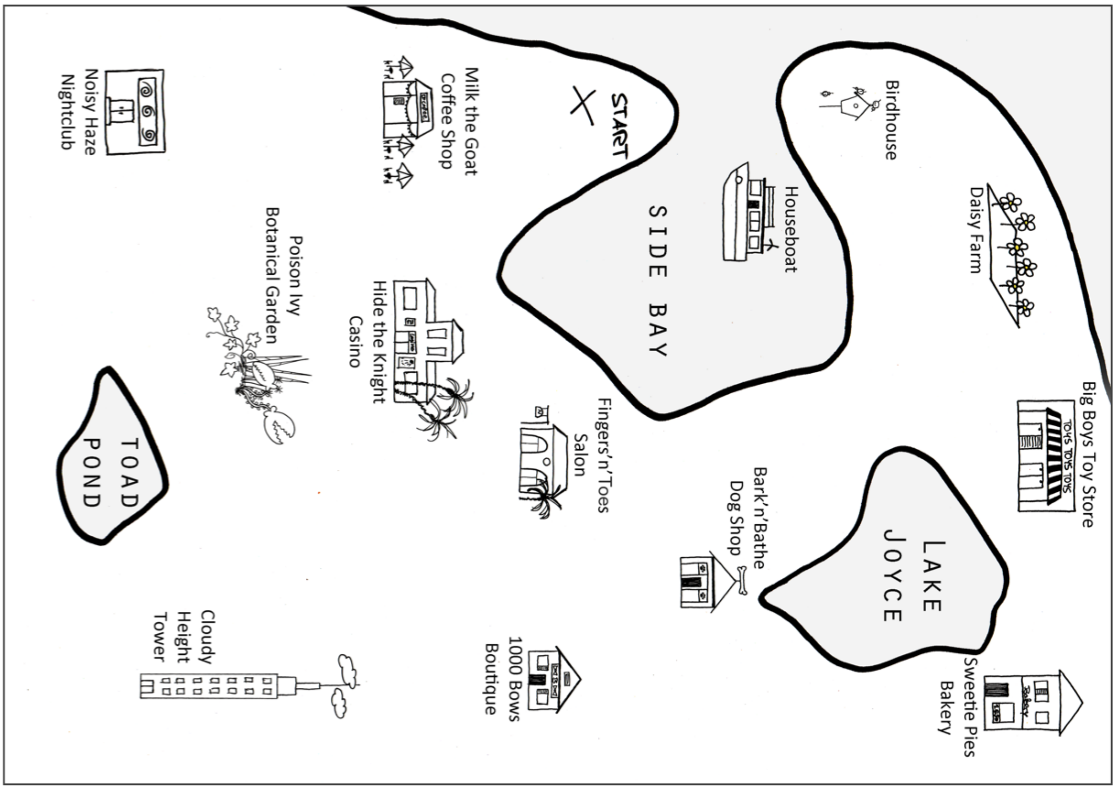


Figure A1.3: Example of map task elicitation materials: Map 2

A2 Number of tokens per speaker

Table A2.2: Number of types and tokens for speakers in the conversational data

Speaker	Lexical set	Items	Types	Tokens
Albert	BATH	after (3), last	2	4
Albert	CHOICE	boy (2), boys	2	3
Albert	CLOTH	cloth, Costley (2), loss, Moss, off (2)	5	7
Albert	DRESS	bed, Betsy, dead (2), death, head (2), let (2), nest, next (2), set (2)	9	14
Albert	FACE	bake, chasing, face (2), make (2), place (2), say (2), shaking, snake, take (2)	9	14
Albert	FLEECE	beat (2), beaten, believe, deep, eat (2), eating, feeding, keep, leaf, leave, people (2), sleep, sleeping, teacher, teeth	15	18
Albert	FOOT	bush (2), good, hook (2), look (2), looking, put (2)	6	10
Albert	GOAT	boat (2), close (2), go (4), know (2), no (2), ocean, smoke (2), smoking (2), so (2), supposed (2)	10	21
Albert	GOOSE	food, move, moving	3	3
Albert	KIT	chicken (2), different, dizzy, fish (2), living , midwife (2), pick, sickness	8	11
Albert	LOT	bother (2), doctor, doctors, dog (2), dosh, god (2), job, knock (2), lot (2), pot, shopping, stop (2)	12	18
Albert	MOUTH	about (2), house (2), houses, how (2), now (2), out (2), south (2)	7	13
Albert	NURSE	bird (2), curse, first, heard, person (2), thirty, turbid	7	9
Albert	PALM	father (2)	1	2
Albert	PRICE	bite, fight (2), five (2), inside (2), light (2), like (2), liking (2), night (2), pipe (2), side (2)	10	19

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(Table A2.2, continued from previous page)

Speaker	Lexical set	Items	Types	Tokens
Albert	START	hard, market (2), park, part (2), shark (2), start	6	9
Albert	STRUT	blood (2), couple (2), cut (2), mother (2), much (2), other, up (3), ups	8	15
Albert	THOUGHT	cause, talk (2), talking	3	4
Albert	TRAP	asthma (2), back (2), bad (2), daddy (2), dash, had (2), happen (2), tackle, thatch (2)	9	16
Albert	Total		132	210
Carol	BATH	after (3), bathroom, last (2), laughing (2), past	5	9
Carol	CHOICE	boy (2), boys	2	3
Carol	CLOTH	boss, bosses, cost (2)	3	4
Carol	DRESS	bed, head, let (2), level, next (2), pepper (2), second (2), section (2), set (2), seven	10	16
Carol	FACE	baby (4), bacon, bathe (2), cake (2), day, days (2), lady (2), make (2), maybe (2), neighbours (2), papers (2), patience (2), place (2), state, take (2), taste	16	30
Carol	FLEECE	believe (2), deep, even, keep (2), leaving, meat, need (2), people (2), sheep, speak (2)	10	15
Carol	FOOT	book (2), books (2), cook (2), good (2), hood, looking (2), put (2)	7	13
Carol	GOAT	clothes (2), goat, jokey (2), mostly, no, smoke (2), smokehouse, spoke	8	11
Carol	GOOSE	do, food (2), lose (2), newborn	4	6
Carol	KIT	big (2), bit, kid, lick, lift, listen, live (2), living, Pitman	9	11
Carol	LOT	dog, dogs, god, gods, job, lock, lot (2), not, off (2), shot, sloppy, stop (2), top	13	16

(continued on next page)

(Table A2.2, continued from previous page)

Speaker	Lexical set	Items	Types	Tokens
Carol	MOUTH	out, outlet (2), outlets, shouting (2), south (2), thousand (2)	6	10
Carol	NURSE	birthday, first (2), person (2), preserve (2), thirty (2), Thursday	6	10
Carol	PALM	father	1	1
Carol	PRICE	besides, decide (2), five (2), hide, ice-cream, inside (2), licence (2), like (2), Lyford (2), might, nice, night (2), tight, type (2)	14	22
Carol	START	car, card, cars, charge (2), garbage, March, part (2), parts (2), start (2)	9	13
Carol	STRUT	buckle (2), bug, bus, couple (2), cousin (2), custom, mother (2), mothers, muck, plus, smuggle	11	15
Carol	THOUGHT	cause, talk (2), talking (2), taught	4	6
Carol	TRAP	back (2), bad (2), black (2), daddy (2), Gladstone (2), happen (2), happy, lab (2), mad, maths, Nassau (2), Saturday (2), splashing	13	22
Carol	Total		151	233
Eddie	BATH	after (3), last (2), laugh (2), pastor (2)	4	9
Eddie	CHOICE	boy (2), poison (2)	2	4
Eddie	CLOTH	coffin, off (3), sausage, soft	4	6
Eddie	DRESS	best (2), check, dead, head (2), lesson, let, mess (2)	7	10
Eddie	FACE	bake, cable (2), day, days (2), make (2), may, patient, save (2), say (2), take (2), taking (2), tape, tapes	13	20
Eddie	FLEECE	beach (2), even, meat, need, peas, people (2), piece (2), see	8	11
Eddie	FOOT	cook (2), foot (2), good (2), hook, look (2), looking, put (2)	7	12

(continued on next page)

(Table A2.2, continued from previous page)

Speaker	Lexical set	Items	Types	Tokens
Eddie	GOAT	boat (2), coat, float, go (2), hotel (2), know (2), most, no (2), nose (2), open (3), remote (2), snow, suppose (2)	13	23
Eddie	GOOSE	food, move (2), scoop	3	4
Eddie	KIT	big, bit, dish, fifteen, fish (2), jitney (2), pitch, six (2), stick, ticket	10	13
Eddie	LOT	bother (2), copper (2), doc (2), doctor (2), jockey (2), knocking, on (4), pocket, pop, pot (2), shop, shopping, stop, top (2)	14	24
Eddie	MOUTH	house (2), now (2), out (2)	3	6
Eddie	NURSE	church (2), first, person, thirty (2)	4	6
Eddie	PRICE	beside, bite (2), five, flies, light (2), like (2), outside, side	8	11
Eddie	START	hard (2), harder, marching, part, shark (2), start (2)	6	9
Eddie	STRUT	club, couple (2), enough, love, much (2), up (3)	6	10
Eddie	THOUGHT	talk (2), talking (2)	2	4
Eddie	TRAP	back (2), bad (2), Catholic, daddy (2), happen (2), mad (2), mash (2), Nassau (2), pack, Patrick, saddle, shad (2), slack	13	21
Eddie	Total		127	203
George	BATH	after (2), basket, glass (2), last, pass	5	7
George	CHOICE	boys	1	1
George	CLOTH	boss, lost, off, office	4	4
George	DRESS	bed (2), dead (2), death, Edgar, head (2), heavy (2), next (2), said (2), second	9	15
George	FACE	baby (2), base (2), case (2), day, days (2), face, late, make (2), papers (2), place (2), places (2), stable (2), state, table (2), take (2), taking	16	27

(continued on next page)

(Table A2.2, continued from previous page)

Speaker	Lexical set	Items	Types	Tokens
George	FLEECE	beach (2), believe, cheat, feed, keep, leave (2), people (2), speak, these	9	12
George	FOOT	cook, cooking, foot, good (2), look (2), put (2)	6	9
George	GOAT	ago, boat, boats, close (4), clothes (4), go (2), know, most, no (2), nose, open, toe	12	20
George	GOOSE	food (2), lose (2), move	3	5
George	KIT	big (2), bit, business (2), fish, fix (2), fixing, hit, listen, live (2), living, miss, Mitchell, niggers, pick (2), picture (2), sister (2), six (2), stick	18	26
George	LOT	body, bother (2), cop, doctor (2), doctors, dog (2), fox (2), got (2), hot, job (2), jobs, jockey, lock (2), not, spot, stop, top (2)	17	25
George	MOUTH	house (2), mouth (2), now (2), out (2), south (2), thousand	6	11
George	NURSE	birthday, burst, church, first (2), further, herb, hurt, murder, person (2), search (2), thirty	11	14
George	PALM	baba, father (2)	2	3
George	PRICE	bible, decide (2), died (2), fight, five (2), hide, light (2), like (2), likes, might (2), nice, night (2), side (2)	13	21
George	START	card (2), charge, harbor, hard (2), heart, Margaret, marks, park (2), part	9	12
George	STRUT	blood, bus (2), club, couple (2), cousin, cut (2), love, lovely, loving, lucky, mother (2), much, southern (2)	13	18
George	THOUGHT	talk (2), talking (2)	2	4

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(Table A2.2, continued from previous page)

Speaker	Lexical set	Items	Types	Tokens
George	TRAP	back (2), bad (2), bag, black (2), daddy (2), happen (2), Nassau, Saturday, that	9	14
George	Total		165	248
Henry	BATH	after, bath, pass	3	3
Henry	CHOICE	boy (2), boyfriend (2)	2	4
Henry	CLOTH	off (3)	1	3
Henry	DRESS	bed (2), best, head, left (2), leg, let (2), lets, success (2)	8	12
Henry	FACE	baby (2), day, estate, face, late, make, maybe (4), naked (2), paid, pay, place, say (2), take (2)	13	20
Henry	FLEECE	cay, eating, evening, meet, people (2), these	6	7
Henry	FOOT	good (2), look (2), put (2)	3	6
Henry	GOAT	ago, boat, close (2), go, load (2), most (2), overload (2)	7	11
Henry	GOOSE	food (2), suit	2	3
Henry	KIT	big (2), different, hip (2), hit, lick, sissy, six, sixty	8	10
Henry	LOT	cops, fox, knock, lock (2), lot, oclock, stop (2)	7	9
Henry	MOUTH	about, house (2), now (2), out, south	5	7
Henry	NURSE	certain, further (2), person (2)	3	5
Henry	PRICE	fight, inside, knife, light (2), like (2), nice (2), night (2), outside, side (2), size	10	15
Henry	START	car, far, garden, part (2), start (2)	5	7
Henry	STRUT	club (2), clubs, love (2), other, southern, sudden, touch, up	8	10
Henry	THOUGHT	talk	1	1
Henry	TRAP	back (2), bad (2), happen, mad, Nassau (2), patting	6	9
Henry	Total		98	142

(continued on next page)

(Table A2.2, continued from previous page)

Speaker	Lexical set	Items	Types	Tokens
Jeanne	BATH	asshole, bathroom (2), class (2), last (2), past	5	8
Jeanne	CHOICE	boy (2), choice (2)	2	4
Jeanne	CLOTH	off (2), soft	2	3
Jeanne	DRESS	accept, ahead, check, head (2), instead, next, said (2), upset (2)	8	11
Jeanne	FACE	baby (4), face, lady (4), make, making, neighbour (4), pay, plate, say (2), take (2), today	11	22
Jeanne	FLEECE	beat (2), eat, keep, keys, leave, meat, people	7	8
Jeanne	FOOT	cook (2), good (2), hooking, look (2), looking, put (2), took	7	11
Jeanne	GOAT	clothes (2), go, goes (2), hotel, know (2), most, no, so (2), stove (2), suppose (2)	10	16
Jeanne	GOOSE	food (2), move (2), moving, soup (2)	4	7
Jeanne	KIT	big, bitch, busy, fifty, hit, kids, lick, listen, live (2), living, niggers, nitty (2), shit (2), shitty, sisters, sit (2)	16	20
Jeanne	LOT	dog (2), forgot, Fox, god, got (2), knock (2), lock, lot, not (2), pot (2), shop, stop (2), top	13	19
Jeanne	MOUTH	about, anyhow, house (2), how, loud, mouth, out	7	8
Jeanne	NURSE	burst, certain (2), curse, dirty (2), first (2), heard (2), murder, person (2), purchase, reverse, third (2), thirteen (2)	12	19
Jeanne	PALM	father (2)	1	2
Jeanne	PRICE	aside (2), bible, bite, fight, life, like, side	7	8
Jeanne	START	arch, charging, March, mark, park, part, start	7	7

(continued on next page)

(Table A2.2, continued from previous page)

Speaker	Lexical set	Items	Types	Tokens
Jeanne	STRUT	bubble, bucket, cuss (2), enough, fuck, fucked, fucking (2), husband, love, mother, stud, stuff (2), touch, ugly (2)	14	18
Jeanne	THOUGHT	bought, talk (2)	2	3
Jeanne	TRAP	back (2), bad, black (2), habit, happens, mad, slap (2)	7	10
Jeanne	Total		142	204
Johnny	BATH	after (2), classes, fast (2), last (2), passing (2), passport, past	7	11
Johnny	CHOICE	boy, choice (2), employ (2), poison (2)	4	7
Johnny	CLOTH	boss (2), cost (2), off (2), office (2)	4	8
Johnny	DRESS	check (2), chest, dead (2), let (3), next (2), sexy, step (2), unless	8	14
Johnny	FACE	day (2), lady (4), make (2), making (2), maybe (4), save (4), shake (2), take (2)	8	22
Johnny	FLEECE	deep (2), leave (2), meat (2), people (2), piece, sleep (2), speak (2), teacher (2)	8	15
Johnny	FOOT	cook (2), good, hook, look (2), put (2)	5	8
Johnny	GOAT	float, go (2), hotel (2), know, most (2), no (2), post (2), so	8	13
Johnny	GOOSE	loose (2), shoes, two	3	4
Johnny	KIT	big (2), chicken (2), fish (2), fix (2), kiss (2), live (2), pick (2), picture (2), ship, sick, sixty (2), ticket	12	21
Johnny	LOT	box (2), clock, hot (2), job (2), lot (2), mop, pop (2), shop (2)	8	14
Johnny	MOUTH	about (2), house (2), how (2), mouse (2), now (2), out, south, thousand (2)	8	14
Johnny	NURSE	church (2), curse (2), first (2), person (2), shirt, t-shirts, thirty (2)	7	12
Johnny	PRICE	dive (2), five (2), guys (2), ice, life, like (2), nice (2), psycho, size	9	14

(continued on next page)

(Table A2.2, continued from previous page)

Speaker	Lexical set	Items	Types	Tokens
Johnny	START	cards (2), cars, charge (2), heart, hearts (2), smart, start (2)	7	11
Johnny	STRUT	hustling (2), knucks (2), love (2), mother (2), plus (2), stuff (2), up (2)	7	14
Johnny	THOUGHT	talk (2), talking (2), thought (2)	3	6
Johnny	TRAP	acting, back (2), black (2), hassle, hats, mad (2), match, Nassau (2), pack, snatch	10	14
Johnny	Total		126	222
MrsMill	BATH	after, glass, last (2), laugh, pass	5	6
MrsMill	CHOICE	boys, noisy, savoy	3	3
MrsMill	DRESS	let, med, met, neck, next (2), said (2)	6	8
MrsMill	FACE	able (2), aids (2), baby (4), bake (2), baking, basin, bathe (2), days (4), hate, major (2), make (2), neighbour (2), neighbours (2), paste, place (2), plays (2), slaves (4), take	18	37
MrsMill	FLEECE	beach, beef (2), eating, leading, leaf, leave (2), measle, meat (2), need, needed, needle, peas (2), people (2), repeats, these (2)	15	21
MrsMill	FOOT	cook (2), good (2), look, push	4	6
MrsMill	GOAT	boat, boats (2), both, goat, know, most, no, so (2), stove (2), suppose (2), supposed (2), those (2)	12	18
MrsMill	GOOSE	shoes	1	1
MrsMill	KIT	big (2), bigger, businesses, chicken, did, different, dig, fifties, fifty (2), fish (2), give, kick, kitchen (2), lick, live (2), sister (2), six, sixty, skip, skipping	20	26
MrsMill	LOT	doctor, doctors, got, hog, lot, oclock, off (2), shop	8	9

(continued on next page)

(Table A2.2, continued from previous page)

Speaker	Lexical set	Items	Types	Tokens
MrsMill	MOUTH	allowed, cows, house (4), out	4	7
MrsMill	NURSE	certain (2), church (2), first (3), heard (2), merchants, person (3), research, thirty, Thursday	9	16
MrsMill	PALM	father	1	1
MrsMill	PRICE	Clyde (2), decide, died, dies, fight (2), five (2), life, light (2), like (2), night	10	15
MrsMill	START	Archie, cars, charcoal, garden (2), hard	5	6
MrsMill	STRUT	blood, bus (2), cousin (2), Dutch (2), love (2), lovers, mother, much (2), mud, shut, stuff (2)	11	17
MrsMill	THOUGHT	bought, Fawkes, saw, talking, thought (2)	5	6
MrsMill	TRAP	back, bad, black (2), blacks, dad, daddy, dashing, happen, Nassau (2)	9	11
MrsMill	Total		146	214
MrsSmith	BATH	after (3), basket, classes, last (2), pass (2)	5	9
MrsSmith	CHOICE	boys (2)	1	2
MrsSmith	CLOTH	boss (2), coffee, off (2)	3	5
MrsSmith	DRESS	check, head, left (2), leg, lessons, let, messed, next, pleasure, said (2)	10	12
MrsSmith	FACE	day, days (2), lady (4), made (2), maker, page (4), papers, pay, places (2), say (2), space, stayed (2), take (2)	13	25
MrsSmith	FLEECE	believe, leave, need, niece (2), people (2)	5	7
MrsSmith	FOOT	book (2), Bouky, cook, good (2), goods, look (2), put (2), took	8	12
MrsSmith	GOAT	ago (2), boat, boats, clothes (4), go (2), know, low-cost, low-down (2), sew, so	10	16
MrsSmith	GOOSE	do, moved, too	3	3

(continued on next page)

(Table A2.2, continued from previous page)

Speaker	Lexical set	Items	Types	Tokens
MrsSmith	KIT	big, bishop, bit, business, chicken, fixed, live (2), pick (2), sick, six, stick, stiff	12	14
MrsSmith	LOT	box, doctors, fox, got (2), job (2), knock, lot (2), lots, oclock (2), shop (2), sloppy, stock (2), stop	13	19
MrsSmith	MOUTH	house (2), lousy, now (3), out (2), shouting	5	9
MrsSmith	NURSE	certain (2), church, first, nursing (2), service, shirts, thirty (2), Thursdays (2)	8	12
MrsSmith	NURSE+/r/	church, first	2	2
MrsSmith	PALM	father (2)	1	2
MrsSmith	PRICE	aside, died (2), five, life, light, like (2), nice (2), nicest, night, side, sight, tidy, type	13	16
MrsSmith	START	cards (2), cars, gardens, park, part, starch, start	7	8
MrsSmith	STRUT	bus, butler, couple, cousin, cousins, cupboard, customs, cut (2), husband, mother (2), much, stuff (2), subjects, sudden, tough	15	18
MrsSmith	THOUGHT	bought, saw (2), talk (2), taught, thought	5	7
MrsSmith	TRAP	active, back (2), bad (2), Baptist, baptize, black, chat, daddy, fashion, happen (2), hats, mad, mass, Nassau, plait	15	18
MrsSmith	Total		154	216
MrsWall	BATH	after (3), fast (2), half, last (2), laugh, mask, pass, passing	8	12
MrsWall	CHOICE	boy (2), boys	2	3
MrsWall	CLOTH	cloth, off (3)	2	4

(continued on next page)

(Table A2.2, continued from previous page)

Speaker	Lexical set	Items	Types	Tokens
MrsWall	DRESS	bed (2), best, dead, egg, every, fed, head (2), left (2), let (2), message, met (2), nest, next (2), says	14	20
MrsWall	FACE	baby (4), cake (2), days (4), fables (2), lady (2), made (2), make (2), places, say (2), shake, snake (2), table (2), take (2), taking, taste	15	30
MrsWall	FLEECE	east, feed, feet (2), knead, leaf, leave (2), meet, needed, sheep, sleep (2), sleeping, teeth	12	15
MrsWall	FOOT	book, bush (2), cook (2), foot (2), good, look (2), put (2)	7	12
MrsWall	GOAT	close, dough, folk, ghost, go (2), goats, know (2), no, so (2)	9	12
MrsWall	GOOSE	do, food (2), moving (2)	3	5
MrsWall	KIT	big, business, chicken, clip, fifty, kitchen (2), liberty, lift, listen, live, lived, liver, mix, sick (2), sit (2)	15	18
MrsWall	LOT	body (2), doctor (2), doctors, dogs, god, got (2), hot, lot (2), modern, oclock, pot, shop, stop (2), toffee (2), top (2)	15	22
MrsWall	MOUTH	about (2), house (2), now (4), out (2), outhouse, powder, souse (2), thousand	8	15
MrsWall	NURSE	birth, certain (2), first (2), nurse (2), sturdy, thirty (2), Thursday	7	11
MrsWall	PALM	father (2)	1	2
MrsWall	PRICE	bite (2), dice, died, eyes (2), five (2), hide, inside (2), like (2), nice, night, outside, side (2), tonight	13	19
MrsWall	START	hard, market (2), parch, part (2), smart, start (2)	6	9

(continued on next page)

(Table A2.2, continued from previous page)

Speaker	Lexical set	Items	Types	Tokens
MrsWall	STRUT	cousin (2), cut (2), husband (2), mother (2), much (2), suck (2), touch, tub (2), up (3)	9	18
MrsWall	THOUGHT	talk (2), talking, taught	3	4
MrsWall	TRAP	back (2), bad (2), bag, baptist, daddy (2), fact, happen, happens, happy, hat (2), ladder, mash, Nassau, sap, slap, slapping	16	20
MrsWall	Total		165	251
Shanae	BATH	after (3), bathroom (2), class (2), fast, last, laughing (2), pass (2), passing, past	9	15
Shanae	CHOICE	boy (2), boyfriend (2), boys	3	5
Shanae	CLOTH	boss (2), cough, coughing, off	4	5
Shanae	DRESS	bed (2), check (2), checking, dead (2), death (2), exwife, let, never, next, sets, step	11	15
Shanae	FACE	baby (4), cable (2), cake (2), eight (2), made (2), maid (2), make (2), makes, making, pacing, place, plate, save (2), say, take (2), taken, taste	17	28
Shanae	FLEECE	keep (2), need (2), people (2), sheet, sleep (2), speak, teeth	7	11
Shanae	FOOT	foot (2), good, look (2), looking (2), looks, push, put (2)	7	11
Shanae	GOAT	close, clothes (2), know (2), no (2), over (2), show, suppose (2), though	8	13
Shanae	GOOSE	food (2), move	2	3
Shanae	KIT	big (2), bit, different, fifty (2), give, kicking, kids, living (2), sick, sit (2), six (2)	11	16
Shanae	LOT	bother, clog (2), doctor (2), hot, lock (2), lot (2), oclock (2), shop, shot, stop (2), stopping	11	17

(continued on next page)

(Table A2.2, continued from previous page)

Speaker	Lexical set	Items	Types	Tokens
Shanae	MOUTH	house (2), now (2), out (3), thousand	4	8
Shanae	NURSE	burst (2), certain, church (2), first (2), murder, nurse, person	7	10
Shanae	PRICE	alike, died, eyes, fight (2), five (2), guys, inside (2), knife, life, light (2), like (2), might, nice (2), night (2), outside (2)	15	23
Shanae	START	Cartwright, dark (2), far, hard, mark, start (2)	6	8
Shanae	STRUT	blood (2), couple, cousin (2), cut (2), discuss, love, lucky (2), mother (2), other (2), stuff, sudden, tub, up (2)	13	20
Shanae	THOUGHT	talk (2), talking, thought	3	4
Shanae	TRAP	add, asthma, back (2), bad (2), bag (2), black, blacking, daddy (2), happen, mad (2)	10	15
Shanae	Total		148	227
Sharon	BATH	bath, bathroom, glasses, half, last (2), laughing, pastor	7	8
Sharon	CHOICE	boy (2), boys, poison (2), voice	4	6
Sharon	CLOTH	boss, cost, lost, off (2)	4	5
Sharon	DRESS	Becks, bed (2), best, checkers, dead (2), death, head (2), leg (2), lesson, let, met (2), next, pebbles, said (2), sex (2)	15	22
Sharon	FACE	baby (4), Bakker (2), day, ladies (2), late, make, maybe (4), naked, neighbours (4), say (2), spade (2), station, take (2), taking, taste	15	29
Sharon	FLEECE	beach (2), believe (2), deacon, Jesus (2), keep (2), least (2), leave, meet, need, needle, people, piece, please, police, seat, sheet	16	21

(continued on next page)

(Table A2.2, continued from previous page)

Speaker	Lexical set	Items	Types	Tokens
Sharon	FOOT	book, bush (2), foot (2), good (2), look (2), push, put (2)	7	12
Sharon	GOAT	boat (2), clothe (2), clothes (4), folks (2), loaf, most, show, smoke, so, soda (2)	10	17
Sharon	GOOSE	booth, food (2)	2	3
Sharon	KIT	big (2), bitch, city, dick, fifty, fig (2), fish (2), fits (2), give, liquor, listen, liver, nigger, pick, picture, shit (2), sick, sister, sit, split, stick (2)	21	27
Sharon	LOT	adopt (2), block, body, dock (2), doctor (2), dog (2), god (2), knock, lodge (2), lot (2), pocket (2), pot, sausage (2), shot (2), stop (2), top	16	27
Sharon	MOUTH	house (3), mouth (4), out (3)	3	10
Sharon	NURSE	burst (2), church (2), curse, Curtis, dirty, first (2), nurse (2), person (2), search (2), Thursday (2), virgin	11	18
Sharon	PALM	father (2), pa	2	3
Sharon	PRICE	alive, bite (2), died (2), dive, eyes, fight (2), five (2), guys, inside (2), knife (2), lied, life (2), light (2), like (2), Lyford, night (2), nighttrain, tonight, types	19	29
Sharon	START	card (2), cardboard, hearts (2), market, shark (2), start (2)	6	10
Sharon	STRUT	blood (2), bluff, bucket, bucks, bug, club (2), couple, cut (2), cutlass, judge (2), knuckle, knuckles, love (2), mother (2), plus, stuff (2), sudden (2)	17	25
Sharon	THOUGHT	Gunhawks, talk (2)	2	3

(continued on next page)

(Table A2.2, continued from previous page)

Speaker	Lexical set	Items	Types	Tokens
Sharon	TRAP	back (2), bad, black (2), chap, daddy (2), happen (2), jacks (2), match, Nassau, Saturday, slap	11	16
Sharon	Total		188	291
Sidney	BATH	after (2), half (2), last (2), pass	4	7
Sidney	CHOICE	boy, boys	2	2
Sidney	CLOTH	off (2)	1	2
Sidney	DRESS	Becks (2), best, bet, dead (2), head, heading, left, leg, never (2), next, said (2), setup, seven (2)	13	18
Sidney	FACE	acre, days (4), made (4), make (2), mason, paper, place, places (2), save (4), state (2), station, take (2), taking, today	14	27
Sidney	FLEECE	believe (2), keep, need, people (2), see, speak, these	7	9
Sidney	FOOT	good (2), look (2), put (2)	3	6
Sidney	GOAT	close, closest, clothes (2), most, so, those (2)	6	8
Sidney	GOOSE	coop, do, two	3	3
Sidney	KIT	big, chicken (2), did (2), dip, fifty, fish, hit (2), licks, live (2), middle, ship (2), six, sixty, ticket	14	19
Sidney	LOT	block, bog, job, knock (2), lot (2), oclock, stop, top	8	10
Sidney	MOUTH	about (2), doubt, house (3), out (2), thousand (2), thousands	6	11
Sidney	NURSE	certain (2), earthquake, first, Percy (2), person (2), purchase, searching, thirty (2)	8	12
Sidney	PALM	father (2)	1	2

(continued on next page)

(Table A2.2, continued from previous page)

Speaker	Lexical set	Items	Types	Tokens
Sidney	PRICE	despite, dice, died (2), dislike, five (2), flight, life (2), lighthouse, like (2), night (2), side, slightly, spite	13	18
Sidney	START	marble (2), mark, part (2), pass	4	6
Sidney	STRUT	discuss (2), dust (2), enough, Kentucky, luck, lucky, mother (2), much (2), mutton, setup, stuck (2), upper	12	17
Sidney	THOUGHT	talk (2), talking (2)	2	4
Sidney	TRAP	Acklins (2), back (2), bad (2), bag, fat, fatten, happen, past	8	11
Sidney	Total		129	192
SisterB	BATH	after (2), class, half, last (2), passing, pastor, path (2)	7	10
SisterB	CHOICE	avoid, boy (2), boyfriend, boys, choice, enjoy (2), noise	7	9
SisterB	CLOTH	coffee, costume (2), coughs, off (2)	4	6
SisterB	DRESS	accept (2), bed (2), bless, check, chest, death, head (2), left, let, medal, next, second (2), set, sex, text	15	19
SisterB	FACE	baby (4), bacon, day, eight, lady (2), maid (2), make, making, mason, nature, paper, pay (2), phase (4), save (2), say, table (2), take	17	28
SisterB	FLEECE	beat, beats, believe, believed, keep (2), leave, need (2), people (2), piece, release, teach, teachers, teeth	13	16
SisterB	FOOT	book, books, bushes, cook (2), foot (2), good (2), look (2), push, put (2), took (2)	10	16
SisterB	GOAT	ago, close (2), goatskin, hope, hoping, know, most, slow, soak, though	10	11

(continued on next page)

(Table A2.2, continued from previous page)

Speaker	Lexical set	Items	Types	Tokens
SisterB	GOOSE	do (2), food (2), goose, lose, move, shoot (2), two	7	10
SisterB	KIT	big (2), bit, different, dig, fix, give, hip, kiss, listen, live, pick (2), six, stick	13	15
SisterB	LOT	box, chop (2), doctor (2), god (2), job (2), knock, lock, lot (2), oclock, stop (2), top	11	17
SisterB	MOUTH	about, cowbells, house (2), now (2), out (2)	5	8
SisterB	NURSE	birds (2), birth (2), certain (2), church (2), circle (2), curse (2), deserve, first (2), further, heard (2), hurt, murder, nurse, nurses, person (2), search, serve, serving, sturdy, thirty (2)	20	30
SisterB	PALM	father, fathers	2	2
SisterB	PRICE	alike, bible (2), five (2), guidance (2), hiking (2), inside, kites, life (2), like (2), nice, night (2), side (2)	12	20
SisterB	START	dark, hard (2), heart, hearts, marble (2), marbles, market, part, start	9	11
SisterB	STRUT	blood (2), bucket, couple, cousins, cut, enough, husband, judge, love (2), mother, mothers, study (2), stuff, suck, tough	15	18
SisterB	THOUGHT	caught, talk (2), talking, taught, thought (2)	5	7
SisterB	TRAP	attach, back (2), backpack, baptize (2), chapters, collapse, daddy (2), fashion, happen (2), mad (2), Sabbath, slap	12	17
SisterB	Total		194	270
Viola	BATH	after (3), fast, last (2), laugh, laughing (2), pass, passport, past, pastor (2)	9	14

(continued on next page)

(Table A2.2, continued from previous page)

Speaker	Lexical set	Items	Types	Tokens
Viola	CHOICE	boy (2), joy, noise, poison, voice	5	6
Viola	CLOTH	off, office (2), soft (2)	3	5
Viola	DRESS	bed (2), bless, check, dead (2), devil, head, leg, next (2), pepper, second (2), set, setting, shed (2), special, test (2)	15	21
Viola	FACE	baby (2), cage (4), day, days (2), gates, maid (4), make (2), paper (2), pay, place, safety, save (2), say, snake (2), stay, table (2), take (2)	17	31
Viola	FLEECE	beach, keep (2), meet, need (2), see (2), seizure (2), sheet, speak, speaker, speed	10	14
Viola	FOOT	bush (2), bushy, foot (2), good (2), look (2), looking (2), put (2)	7	13
Viola	GOAT	boat (2), close, ghost, know (2), motor (2), no, open, smoke (2), suppose (2), supposed (2)	10	16
Viola	GOOSE	food, shoot, two	3	3
Viola	KIT	big (2), bigger, bit, different (2), fix, give (2), live (2), liver, living, mix, pick (2), shit, sick (2), sister (2), skipping (2), stick	16	24
Viola	LOT	doctor (2), god (2), hog (2), hopping, job, knock, knocking, lodge, lot, Moxey (2), oclock (2), shop (2), stop (2), top	14	21
Viola	MOUTH	house (2), loud, mouth (2), now (2), out, south	6	9
Viola	NURSE	birds, certain, church (2), first (2), further, hurt, nurse (2), person (2), thirty	9	13
Viola	PRICE	bite (2), fight, five (2), hide, light, like (2), nice (2), night, pipe	9	13

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(Table A2.2, continued from previous page)

Speaker	Lexical set	Items	Types	Tokens
Viola	START	Archer (2), card (2), cards, dark (2), hard (2), heart, march (2), marching (2), mark (2), market, part (2), smart, start (2)	13	22
Viola	STRUT	blood, bucket, bus (2), Chub, couple (2), guts, Kentucky, knucks, mother (2), much, smother, up (3)	12	17
Viola	THOUGHT	saw, talk (2), talking (2)	3	5
Viola	TRAP	back (2), backward, bad (2), bag, black (2), clapping, daddy (2), fat, happen (2), Nassau (2), pack	11	17
Viola	Total		172	264
Grandtotal			–	3387

Table A2.3: Number of types and tokens for speakers in the map task and citation form data

Speaker	Lexical set	Map task		Citation form		Total
		Types	Tokens	Types	Tokens	Tokens
Ada01	BATH	–	–	1	1	1
Ada01	CHOICE	5	5	17	34	39
Ada01	CLOTH	–	–	3	6	6
Ada01	DRESS	–	–	4	7	7
Ada01	FACE	5	8	10	26	34
Ada01	FLEECE	–	–	6	9	9
Ada01	FOOT	–	–	5	7	7
Ada01	GOAT	3	6	8	19	25
Ada01	GOOSE	–	–	5	9	9
Ada01	KIT	–	–	6	9	9
Ada01	LOT	–	–	6	10	10
Ada01	MOUTH	7	11	14	19	30
Ada01	NURSE	7	11	12	18	29

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(Table A2.3, continued from previous page)

Speaker	Lexical set	Map task Types	Map task Tokens	Citation form Types	Citation form Tokens	Total Tokens
Ada01	NURSE+/r/	1	1	5	7	8
Ada01	PALM	–	–	2	3	3
Ada01	PRICE	7	9	13	18	27
Ada01	START	–	–	6	8	8
Ada01	STRUT	–	–	5	9	9
Ada01	THOUGHT	–	–	8	10	10
Ada01	TRAP	–	–	5	8	8
Ada01	Total	35	51	141	237	288
Ada02	BATH	–	–	4	10	10
Ada02	CHOICE	6	14	13	22	36
Ada02	CLOTH	–	–	1	1	1
Ada02	DRESS	–	–	5	11	11
Ada02	FACE	5	9	6	13	22
Ada02	FLEECE	–	–	7	11	11
Ada02	FOOT	–	–	5	10	10
Ada02	GOAT	4	9	8	27	36
Ada02	GOOSE	–	–	6	11	11
Ada02	KIT	–	–	5	9	9
Ada02	LOT	–	–	6	12	12
Ada02	MOUTH	10	27	12	23	50
Ada02	NURSE	8	25	9	11	36
Ada02	NURSE+/r/	–	–	7	8	8
Ada02	PALM	–	–	2	4	4
Ada02	PRICE	7	20	13	19	39
Ada02	START	–	–	8	13	13
Ada02	START+/r/	–	–	2	2	2
Ada02	STRUT	–	–	4	8	8
Ada02	THOUGHT	–	–	6	9	9
Ada02	TRAP	–	–	6	11	11
Ada02	Total	40	104	135	245	349
Ada03	BATH	–	–	4	6	6

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(Table A2.3, continued from previous page)

Speaker	Lexical set	Map task		Citation form		Total
		Types	Tokens	Types	Tokens	Tokens
Ada03	CHOICE	7	10	17	33	43
Ada03	CLOTH	–	–	3	6	6
Ada03	DRESS	–	–	5	9	9
Ada03	FACE	6	13	10	28	41
Ada03	FLEECE	–	–	6	13	13
Ada03	FOOT	–	–	5	10	10
Ada03	GOAT	5	11	10	30	41
Ada03	GOOSE	–	–	6	12	12
Ada03	KIT	–	–	6	12	12
Ada03	LOT	–	–	6	13	13
Ada03	MOUTH	7	20	12	24	44
Ada03	NURSE	8	14	11	20	34
Ada03	NURSE+/r/	1	1	9	15	16
Ada03	PALM	–	–	2	4	4
Ada03	PRICE	8	15	14	28	43
Ada03	START	–	–	10	21	21
Ada03	STRUT	–	–	5	11	11
Ada03	THOUGHT	–	–	6	12	12
Ada03	TRAP	–	–	6	11	11
Ada03	Total	42	84	153	318	402
Ada05	BATH	–	–	4	7	7
Ada05	CHOICE	6	9	15	25	34
Ada05	CLOTH	–	–	3	5	5
Ada05	DRESS	–	–	5	8	8
Ada05	FACE	3	6	10	28	34
Ada05	FLEECE	–	–	9	13	13
Ada05	FOOT	–	–	5	10	10
Ada05	GOAT	5	9	9	26	35
Ada05	GOOSE	–	–	6	11	11
Ada05	KIT	–	–	6	12	12
Ada05	LOT	–	–	5	10	10

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(Table A2.3, continued from previous page)

Speaker	Lexical set	Map task		Citation form		Total
		Types	Tokens	Types	Tokens	Tokens
Ada05	MOUTH	5	10	12	23	33
Ada05	NURSE	9	10	4	7	17
Ada05	NURSE+/r/	–	–	14	26	26
Ada05	PALM	–	–	2	3	3
Ada05	PRICE	6	7	13	25	32
Ada05	START	–	–	9	14	14
Ada05	START+/r/	–	–	3	4	4
Ada05	STRUT	–	–	5	7	7
Ada05	THOUGHT	–	–	7	10	10
Ada05	TRAP	–	–	5	9	9
Ada05	Total	34	51	151	283	334
Art01	BATH	–	–	4	7	7
Art01	CHOICE	3	3	9	17	20
Art01	CLOTH	–	–	2	3	3
Art01	DRESS	–	–	5	12	12
Art01	FACE	5	8	10	35	43
Art01	FLEECE	–	–	6	11	11
Art01	FOOT	–	–	4	8	8
Art01	GOAT	4	6	10	31	37
Art01	GOOSE	–	–	6	10	10
Art01	KIT	–	–	6	12	12
Art01	LOT	–	–	4	7	7
Art01	MOUTH	6	10	12	22	32
Art01	NURSE	4	5	2	3	8
Art01	NURSE+/r/	3	7	10	19	26
Art01	PALM	–	–	2	6	6
Art01	PRICE	7	8	14	30	38
Art01	START+/r/	–	–	6	11	11
Art01	STRUT	–	–	5	10	10
Art01	THOUGHT	–	–	4	7	7
Art01	TRAP	–	–	6	12	12

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(Table A2.3, continued from previous page)

Speaker	Lexical set	Map task Types	Map task Tokens	Citation form Types	Citation form Tokens	Total Tokens
Art01	Total	32	47	127	273	320
Art02	BATH	–	–	4	10	10
Art02	CHOICE	6	8	17	34	42
Art02	CLOTH	–	–	3	6	6
Art02	DRESS	–	–	5	10	10
Art02	FACE	5	8	10	29	37
Art02	FLEECE	–	–	6	11	11
Art02	FOOT	–	–	5	10	10
Art02	GOAT	4	5	10	33	38
Art02	GOOSE	–	–	6	12	12
Art02	KIT	–	–	6	12	12
Art02	LOT	–	–	5	10	10
Art02	MOUTH	7	11	13	25	36
Art02	NURSE	3	3	8	13	16
Art02	NURSE+/r/	5	8	11	20	28
Art02	PALM	–	–	2	4	4
Art02	PRICE	9	12	14	28	40
Art02	START	–	–	1	2	2
Art02	START+/r/	–	–	9	18	18
Art02	STRUT	–	–	5	9	9
Art02	THOUGHT	–	–	6	11	11
Art02	TRAP	–	–	6	12	12
Art02	Total	39	55	152	319	374
Art03	BATH	–	–	4	8	8
Art03	CHOICE	7	16	16	30	46
Art03	CLOTH	–	–	2	4	4
Art03	DRESS	–	–	5	8	8
Art03	FACE	7	15	10	28	43
Art03	FLEECE	–	–	7	13	13
Art03	FOOT	–	–	5	9	9
Art03	GOAT	5	10	10	29	39

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(Table A2.3, continued from previous page)

Speaker	Lexical set	Map task		Citation form		Total
		Types	Tokens	Types	Tokens	Tokens
Art03	GOOSE	–	–	6	8	8
Art03	KIT	–	–	6	11	11
Art03	LOT	–	–	6	11	11
Art03	MOUTH	8	17	12	20	37
Art03	NURSE	4	6	–	–	6
Art03	NURSE+/r/	9	14	14	22	36
Art03	PALM	–	–	2	4	4
Art03	PRICE	10	20	14	29	49
Art03	START	–	–	6	6	6
Art03	START+/r/	–	–	8	10	10
Art03	STRUT	–	–	5	10	10
Art03	THOUGHT	–	–	6	9	9
Art03	TRAP	–	–	6	12	12
Art03	Total	50	98	150	281	379
Art04	BATH	–	–	4	7	7
Art04	CHOICE	7	23	17	33	56
Art04	CLOTH	–	–	3	6	6
Art04	DRESS	–	–	5	9	9
Art04	FACE	6	17	10	30	47
Art04	FLEECE	–	–	6	10	10
Art04	FOOT	–	–	5	10	10
Art04	GOAT	3	10	10	30	40
Art04	GOOSE	–	–	6	11	11
Art04	KIT	–	–	6	12	12
Art04	LOT	–	–	6	12	12
Art04	MOUTH	9	29	12	25	54
Art04	NURSE	4	11	–	–	11
Art04	NURSE+/r/	6	18	17	31	49
Art04	PALM	–	–	2	4	4
Art04	PRICE	11	35	14	29	64
Art04	START	–	–	9	13	13

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(Table A2.3, continued from previous page)

Speaker	Lexical set	Map task Types	Map task Tokens	Citation form Types	Citation form Tokens	Total Tokens
Art04	START+/r/	–	–	6	7	7
Art04	STRUT	–	–	5	11	11
Art04	THOUGHT	–	–	6	12	12
Art04	TRAP	–	–	6	11	11
Art04	Total	46	143	155	313	456
Art06	BATH	–	–	4	10	10
Art06	CHOICE	7	19	17	29	48
Art06	CLOTH	–	–	3	6	6
Art06	DRESS	–	–	5	9	9
Art06	FACE	5	11	10	31	42
Art06	FLEECE	–	–	6	12	12
Art06	FOOT	–	–	5	10	10
Art06	GOAT	4	14	10	30	44
Art06	GOOSE	–	–	5	11	11
Art06	KIT	–	–	6	12	12
Art06	LOT	–	–	6	13	13
Art06	MOUTH	7	16	12	22	38
Art06	NURSE	5	10	12	21	31
Art06	NURSE+/r/	2	5	6	10	15
Art06	PALM	–	–	2	4	4
Art06	PRICE	11	24	14	29	53
Art06	START	–	–	8	15	15
Art06	START+/r/	–	–	1	2	2
Art06	STRUT	–	–	5	10	10
Art06	THOUGHT	–	–	6	12	12
Art06	TRAP	–	–	6	12	12
Art06	Total	41	99	149	310	409
Ben01	BATH	–	–	4	8	8
Ben01	CHOICE	7	16	17	32	48
Ben01	CLOTH	–	–	3	6	6
Ben01	DRESS	–	–	5	10	10

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(Table A2.3, continued from previous page)

Speaker	Lexical set	Map task Types	Map task Tokens	Citation form Types	Citation form Tokens	Total Tokens
Ben01	FACE	6	11	10	30	41
Ben01	FLEECE	–	–	6	12	12
Ben01	FOOT	–	–	5	10	10
Ben01	GOAT	4	11	10	31	42
Ben01	GOOSE	–	–	6	12	12
Ben01	KIT	–	–	6	13	13
Ben01	LOT	–	–	6	11	11
Ben01	MOUTH	7	19	12	24	43
Ben01	NURSE	–	–	1	1	1
Ben01	NURSE+/r/	8	16	15	28	44
Ben01	PALM	–	–	2	4	4
Ben01	PRICE	12	23	14	27	50
Ben01	START	–	–	8	14	14
Ben01	START+/r/	–	–	4	6	6
Ben01	STRUT	–	–	5	10	10
Ben01	THOUGHT	–	–	6	12	12
Ben01	TRAP	–	–	6	11	11
Ben01	Total	44	96	151	312	408
Ben02	BATH	–	–	4	8	8
Ben02	CHOICE	7	13	17	34	47
Ben02	CLOTH	–	–	3	6	6
Ben02	DRESS	–	–	5	10	10
Ben02	FACE	5	10	10	30	40
Ben02	FLEECE	–	–	6	11	11
Ben02	FOOT	–	–	5	10	10
Ben02	GOAT	3	11	10	30	41
Ben02	GOOSE	–	–	6	11	11
Ben02	KIT	–	–	6	12	12
Ben02	LOT	–	–	6	12	12
Ben02	MOUTH	8	20	12	24	44
Ben02	NURSE+/r/	8	16	17	32	48

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(Table A2.3, continued from previous page)

Speaker	Lexical set	Map task Types	Map task Tokens	Citation form Types	Citation form Tokens	Total Tokens
Ben02	PALM	–	–	2	4	4
Ben02	PRICE	12	29	14	28	57
Ben02	START	–	–	2	2	2
Ben02	START+/r/	–	–	10	18	18
Ben02	STRUT	–	–	5	10	10
Ben02	THOUGHT	–	–	6	12	12
Ben02	TRAP	–	–	6	12	12
Ben02	Total	43	99	152	316	415
Ben03	BATH	–	–	4	9	9
Ben03	CHOICE	6	10	17	35	45
Ben03	CLOTH	–	–	3	6	6
Ben03	DRESS	–	–	5	10	10
Ben03	FACE	5	6	10	32	38
Ben03	FLEECE	–	–	6	11	11
Ben03	FOOT	–	–	5	10	10
Ben03	GOAT	5	12	10	28	40
Ben03	GOOSE	–	–	6	11	11
Ben03	KIT	–	–	6	12	12
Ben03	LOT	–	–	6	12	12
Ben03	MOUTH	8	18	13	23	41
Ben03	NURSE+/r/	5	12	15	25	37
Ben03	PALM	–	–	2	4	4
Ben03	PRICE	7	16	14	28	44
Ben03	START	–	–	10	16	16
Ben03	START+/r/	–	–	3	3	3
Ben03	STRUT	–	–	5	10	10
Ben03	THOUGHT	–	–	6	12	12
Ben03	TRAP	–	–	6	11	11
Ben03	Total	36	74	152	308	382
Ben04	BATH	–	–	4	8	8
Ben04	CHOICE	7	8	17	33	41

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(Table A2.3, continued from previous page)

Speaker	Lexical set	Map task		Citation form		Total
		Types	Tokens	Types	Tokens	Tokens
Ben04	CLOTH	–	–	3	6	6
Ben04	DRESS	–	–	5	13	13
Ben04	FACE	6	9	10	32	41
Ben04	FLEECE	–	–	6	11	11
Ben04	FOOT	–	–	5	10	10
Ben04	GOAT	6	9	9	25	34
Ben04	GOOSE	–	–	6	12	12
Ben04	KIT	–	–	6	12	12
Ben04	LOT	–	–	6	12	12
Ben04	MOUTH	8	12	12	24	36
Ben04	NURSE	2	2	1	2	4
Ben04	NURSE+/r/	6	7	16	33	40
Ben04	PALM	–	–	2	4	4
Ben04	PRICE	9	17	14	28	45
Ben04	START	–	–	2	3	3
Ben04	START+/r/	–	–	9	17	17
Ben04	STRUT	–	–	5	11	11
Ben04	THOUGHT	–	–	6	12	12
Ben04	TRAP	–	–	6	12	12
Ben04	Total	44	64	150	320	384
Beth02	BATH	–	–	4	7	7
Beth02	CHOICE	7	18	17	33	51
Beth02	CLOTH	–	–	3	5	5
Beth02	DRESS	–	–	5	10	10
Beth02	FACE	6	12	10	27	39
Beth02	FLEECE	–	–	6	11	11
Beth02	FOOT	–	–	5	10	10
Beth02	GOAT	5	11	10	27	38
Beth02	GOOSE	–	–	6	10	10
Beth02	KIT	–	–	6	12	12
Beth02	LOT	–	–	6	11	11

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(Table A2.3, continued from previous page)

Speaker	Lexical set	Map task		Citation form		Total
		Types	Tokens	Types	Tokens	Tokens
Beth02	MOUTH	8	15	12	23	38
Beth02	NURSE+/r/	9	22	16	26	48
Beth02	PALM	–	–	2	4	4
Beth02	PRICE	10	25	14	27	52
Beth02	START+/r/	–	–	9	17	17
Beth02	STRUT	–	–	5	10	10
Beth02	THOUGHT	–	–	6	11	11
Beth02	TRAP	–	–	6	11	11
Beth02	Total	45	103	148	292	395
Beth03	BATH	–	–	4	7	7
Beth03	CHOICE	7	11	17	32	43
Beth03	CLOTH	–	–	3	6	6
Beth03	DRESS	–	–	5	9	9
Beth03	FACE	5	6	10	32	38
Beth03	FLEECE	–	–	6	11	11
Beth03	FOOT	–	–	4	8	8
Beth03	GOAT	5	9	10	29	38
Beth03	GOOSE	–	–	5	10	10
Beth03	KIT	–	–	6	13	13
Beth03	LOT	–	–	6	11	11
Beth03	MOUTH	6	10	12	23	33
Beth03	NURSE	1	1	2	2	3
Beth03	NURSE+/r/	5	8	17	31	39
Beth03	PALM	–	–	2	4	4
Beth03	PRICE	7	18	14	27	45
Beth03	START	–	–	2	2	2
Beth03	START+/r/	–	–	10	17	17
Beth03	STRUT	–	–	5	10	10
Beth03	THOUGHT	–	–	6	12	12
Beth03	TRAP	–	–	6	12	12
Beth03	Total	36	63	152	308	371

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(Table A2.3, continued from previous page)

Speaker	Lexical set	Map task Types	Map task Tokens	Citation form Types	Citation form Tokens	Total Tokens
Beth05	BATH	–	–	4	8	8
Beth05	CHOICE	8	16	16	29	45
Beth05	CLOTH	–	–	3	7	7
Beth05	DRESS	–	–	5	10	10
Beth05	FACE	6	16	10	31	47
Beth05	FLEECE	–	–	6	12	12
Beth05	FOOT	–	–	5	9	9
Beth05	GOAT	5	17	10	29	46
Beth05	GOOSE	–	–	6	10	10
Beth05	KIT	–	–	6	12	12
Beth05	LOT	–	–	6	11	11
Beth05	MOUTH	9	27	12	24	51
Beth05	NURSE+/r/	9	20	17	31	51
Beth05	PALM	–	–	2	4	4
Beth05	PRICE	11	29	14	25	54
Beth05	START	–	–	1	1	1
Beth05	START+/r/	–	–	10	18	18
Beth05	STRUT	–	–	5	10	10
Beth05	THOUGHT	–	–	6	12	12
Beth05	TRAP	–	–	6	12	12
Beth05	Total	48	125	150	305	430
Beth06	BATH	–	–	4	8	8
Beth06	CHOICE	8	16	17	25	41
Beth06	CLOTH	–	–	3	6	6
Beth06	DRESS	–	–	5	8	8
Beth06	FACE	6	12	10	26	38
Beth06	FLEECE	–	–	6	12	12
Beth06	FOOT	–	–	5	9	9
Beth06	GOAT	5	15	8	18	33
Beth06	GOOSE	–	–	4	5	5
Beth06	KIT	–	–	6	11	11

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(Table A2.3, continued from previous page)

Speaker	Lexical set	Map task		Citation form		Total
		Types	Tokens	Types	Tokens	Tokens
Beth06	LOT	–	–	6	10	10
Beth06	MOUTH	8	19	12	23	42
Beth06	NURSE	5	5	–	–	5
Beth06	NURSE+/r/	7	18	13	20	38
Beth06	PALM	–	–	2	4	4
Beth06	PRICE	11	24	13	22	46
Beth06	START	–	–	1	1	1
Beth06	START+/r/	–	–	10	17	17
Beth06	STRUT	–	–	5	9	9
Beth06	THOUGHT	–	–	6	11	11
Beth06	TRAP	–	–	6	12	12
Beth06	Total	50	109	142	257	366
Beth07	BATH	–	–	4	6	6
Beth07	CHOICE	4	4	14	21	25
Beth07	CLOTH	–	–	2	4	4
Beth07	DRESS	–	–	5	9	9
Beth07	FACE	3	6	9	26	32
Beth07	FLEECE	–	–	6	10	10
Beth07	FOOT	–	–	5	10	10
Beth07	GOAT	5	9	9	24	33
Beth07	GOOSE	–	–	6	9	9
Beth07	KIT	–	–	6	12	12
Beth07	LOT	–	–	6	12	12
Beth07	MOUTH	7	14	11	19	33
Beth07	NURSE	4	10	–	–	10
Beth07	NURSE+/r/	4	6	15	24	30
Beth07	PALM	–	–	2	4	4
Beth07	PRICE	6	10	14	23	33
Beth07	START	–	–	3	3	3
Beth07	START+/r/	–	–	10	15	15
Beth07	STRUT	–	–	5	9	9

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(Table A2.3, continued from previous page)

Speaker	Lexical set	Map task Types	Map task Tokens	Citation form Types	Citation form Tokens	Total Tokens
Beth07	THOUGHT	–	–	6	11	11
Beth07	TRAP	–	–	6	10	10
Beth07	Total	33	59	144	261	320
Grandtotal		–	1524	–	5258	6782

A3 Linguistic ranking of speakers across speech styles

Table A3.4: Linguistic ranking of speakers across all speech styles, based on (ʌu), i.e. the relative position with respect to TRAP and GOOSE of the nucleus in pre-voiceless MOUTH, and (ʌi), i.e. the degree of diphthongisation of post-labial NURSE relative to CHOICE

Style	Social status	Speaker	(ʌu): log ratio (rank)	(ʌi): ratio (rank)	Ranking average
Cit. form	MS-3	Beth07	-2.167 (1)	0.15 (3)	2.0
Cit. form	MS-1,2	Ben02	-1.596 (4)	0.155 (4)	4.0
Cit. form	WC-4	Art03	-1.29 (8)	0.176 (7)	7.5
Cit. form	MS-1,2	Ben01	-1.234 (10)	0.164 (5)	7.5
Cit. form	MS-1,2	Beth02	-1.72 (3)	0.259 (13)	8.0
Cit. form	MS-1,2	Beth05	-1.447 (7)	0.19 (10)	8.5
Cit. form	MS-3	Beth06	-1.824 (2)	0.271 (16)	9.0
Cit. form	WC-3	Ada05	-1.465 (6)	0.263 (14)	10.0
Cit. form	WC-3	Art04	-1.107 (13)	0.177 (8)	10.5
Cit. form	MS-1,2	Ben04	-1.279 (9)	0.221 (12)	10.5
Map task	MS-1,2	Ben02	-1.469 (5)	0.28 (17)	11.0
Map task	MS-1,2	Beth05	-0.931 (21)	0.131 (2)	11.5
Cit. form	MS-3	Beth03	-0.876 (22)	0.174 (6)	14.0
Map task	MS-1,2	Ben04	-1.155 (11)	0.366 (23)	17.0
Cit. form	WC-4	Art02	-1.073 (14)	0.395 (24)	19.0

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(Table A3.4, continued from previous page)

Style	Social status	Speaker	(ʌu): log ratio (rank)	(ʌi): ratio (rank)	Ranking average
Map task	MS-3	Beth07	-0.935 (20)	0.281 (18)	19.0
Cit. form	WC-3	Art01	-0.337 (38)	0.114 (1)	19.5
Map task	MS-1,2	Beth02	-0.727 (28)	0.196 (11)	19.5
Cit. form	MS-1,2	Ben03	-0.647 (31)	0.189 (9)	20.0
Cit. form	WC-3	Ada03	-0.998 (16)	0.411 (27)	21.5
Cit. form	WC-2	Art06	-1.153 (12)	0.487 (31)	21.5
Map task	MS-1,2	Ben01	-0.809 (23)	0.339 (20)	21.5
Map task	WC-4	Art03	-0.993 (17)	0.422 (28)	22.5
Map task	MS-3	Beth06	-0.678 (30)	0.265 (15)	22.5
Cit. form	WC-4	Ada02	-0.804 (24)	0.349 (22)	23.0
Map task	WC-4	Art02	-0.694 (29)	0.297 (19)	24.0
Map task	WC-3	Ada01	-0.935 (19)	0.574 (35)	27.0
Convers.	PB-1	MrsSmith	-0.945 (18)	0.62 (37)	27.5
Convers.	MS-6	SisterB	-0.529 (32)	0.399 (25)	28.5
Convers.	PB-3	MrsMill	-0.763 (26)	0.55 (34)	30.0
Map task	WC-3	Art04	-0.417 (35)	0.41 (26)	30.5
Convers.	MS-6	Jeanne	-1.038 (15)	0.911 (47)	31.0
Cit. form	WC-3	Ada01	-0.737 (27)	0.575 (36)	31.5
Convers.	WC-6	Henry	-0.779 (25)	0.703 (38)	31.5
Map task	WC-3	Art01	-0.42 (33)	0.527 (33)	33.0
Map task	WC-2	Art06	-0.38 (37)	0.438 (29)	33.0
Convers.	PB-2	MrsWall	-0.395 (36)	0.498 (32)	34.0
Map task	MS-1,2	Ben03	0.445 (48)	0.349 (21)	34.5
Map task	WC-3	Ada03	-0.418 (34)	0.773 (43)	38.5
Convers.	WC-2	George	-0.326 (39)	0.707 (39)	39.0
Map task	MS-3	Beth03	0.503 (49)	0.455 (30)	39.5
Convers.	WC-3	Carol	-0.067 (40)	0.766 (42)	41.0
Map task	WC-4	Ada02	0.047 (44)	0.712 (40)	42.0
Convers.	WC-4	Eddie	-0.022 (41)	0.893 (46)	43.5
Map task	WC-3	Ada05	0.041 (43)	0.796 (45)	44.0
Convers.	WC-4	Albert	0.034 (42)	0.943 (48)	45.0

(continued on next page)

(Table A3.4, continued from previous page)

Style	Social status	Speaker	(ʌu): log ratio (rank)	(ʌi): ratio (rank)	Ranking average
Convers.	WC-5	Viola	0.099 (46)	0.795 (44)	45.0
Convers.	WC-5	Shanae	0.961 (50)	0.726 (41)	45.5
Convers.	WC-3	Sharon	0.082 (45)	0.972 (49)	47.0
Convers.	WC-3	Sidney	0.364 (47)	1.031 (50)	48.5
Convers.	WC-6	Johnny	1.135 (51)	1.196 (51)	51.0

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