Stellenbosch Papers in Linguistics Plus, Vol. 64, 2022, 79-110
doi: 10.5842/64-1-925

The colour of liquid: a sociophonetic analysis of the changing positional allophony of the South African English lateral approximant

Ian Bekker[1]

School of Languages, North-West University, Potchefstroom Campus, South Africa
E-mail: ian.bekker@nwu.ac.za

Alida Chevalier

E-mail: alida.chevalier@gmail.com

Abstract
This article provides a sociophonetic analysis of General South African English /l/, based on the naturalistic speech of 50 male and female L1-speakers of this variety of South African English (SAfE), all from Cape Town and ranging from 18-82 years of age. Emphasis falls on testing descriptions provided by the impressionistic literature of the so-called 'colour' of the two main allophones of this phoneme i.e. those in initial and final positions; and on determining whether there has been any change in this regard. The relevant phonetic (acoustic) analysis focuses on the parameters of F2 or F2-F1 (as general measures of 'colour') and co-articulatory resistance (as an additional parameter of darkening, particularly with respect to final-/l/) to determine the overall status of /l/ as well as to determine whether or not the acoustic difference between initial-/l/ and final-/l/ meets the criteria provided by Recasens (2012) for extrinsic allophony. These parameters also constitute dependent variables for a statistical analysis which determines the relative effect of one internal (positional allophony) and two external (age and gender) independent variables on these parameters. The results provide evidence to suggest that pronouncements in the impressionistic literature are incorrect. While there has been a darkening of /l/-colour in apparent time, /l/-colour in General SAfE has been and is consistently of a relatively dark kind, as in the case of the Australasian varieties of English, the closest relatives of SAfE. Furthermore, results show that any remaining difference in colour between the two positional allophones is purely the result of intrinsic allophony i.e. General SAfE does not display a full RP-like clear-dark allophony. Results do, however, confirm that female speakers have a slightly more fronted variant of initial-/l/, probably a prestige variant.

Keywords: South African English; English phonetics; English accents; sociophonetics; acoustic analysis; liquids; alveolar lateral; sound change

[1] Corresponding author.

1. Introduction

South African English (SAfE henceforth) is a Southern Hemisphere, non-rhotic variety of English. The term “SAfE” has been used ambiguously in the literature to refer either to all varieties of English spoken in South Africa (thus inclusive of both L1-varieties such as South African Indian English as well as L2-varieties such as Afrikaans English), or, on the other hand, to the ancestral, L1-variety still mostly spoken by white individuals. The second usage is the one employed in the rest of this article, unless otherwise indicated. This variety is generally divided into three main sociolects: Broad South African English (BrSAfE), General South African English (GenSAfE) and Cultivated South African English (CulSAfE). The focus of this research is on GenSAfE, the local standard. BrSAfE and CulSAfE are, respectively, definable as the non-standard vernacular and as an RP-based variant[2], both of which are currently undergoing diminishing numbers as well as standing in the broader SAfE-speaking community.

Sociophonetic research on GenSAfE in particular, but also on other sub-varieties of SAfE[3], has in recent years begun adopting modern acoustic methods of research, mainly focused on the vowel system (Bekker 2009, 2013, 2017; Bekker & Eley 2007; Chevalier 2016; Mesthrie 2010, 2017; Mesthrie, Chevalier & Dunne 2015; Toefy 2017; etc.), but with a few cases of acoustic investigation into the consonants of this dialect as well (Bekker 2007; O’Grady & Bekker 2011). The liquid system, /l/ and /r/, has however, up to this point, not received attention in this regard; and even in the impressionistic literature remarks are scattered and generally part of more general descriptions of the SAfE dialect. An initial, exploratory, sociophonetic, acoustic analysis of at least part of this sub-system of the (Gen)SAfE accent is thus overdue, particularly given the existence of disagreement in the impressionistic SAfE literature concerning the status of /l/. This article goes some way towards providing such an analysis, focusing, as it does, on providing a sociophonetic investigation, using modern acoustic methods, into some of the sociophonetic properties of /l/, as produced in naturalistic speech by 50 GenSAfE speakers from Cape Town.

Section 2 below provides an overview of relevant phonetic and phonological cross-linguistic features of /l/. Section 3 reviews the available (impressionistic) literature on this phoneme in SAfE, while Section 4 provides a preliminary discussion which motivates for a number of general hypotheses which formed the focus of the empirical research reported on in this article. Section 5 outlines the methodology utilized and operationalizes the hypotheses outlined in the previous section, while Section 6 provides the empirical results. Section 7 provides an item-by-item summary of the results in the light of the general hypotheses proposed in Section 4, while Section 8 provides a more general summary along with some suggestions for future research.

2. The phonetics and phonology of /l/

2.1 Basic considerations

This article is focused on the liquid system of SAfE. Ladefoged & Maddieson (1996: 182) provide the following cross-linguistic description of liquids:

---

[2] A near-RP variety in Wells’ (1982: 297-301) terminology.
[3] Here referring to both L2 and L1 varieties.

> The common type of laterals, voiced lateral approximants, have generally been grouped with rhotics (r-sounds) under the name of 'liquids' … [they] are grouped together because they share certain phonetic and phonological properties. Phonetically they are among the most sonorous of oral consonants. And liquids often form a special class in the phonotactics of a language.

Canonically, the voiced lateral alveolar approximant, [l], has, as its primary articulation, the placement of the tip or blade of the laterally lowered tongue on the alveolar ridge[4]. This leaves the body and/or root of the tongue free for a secondary, approximant (vowel-like) articulation, a fact which makes it possible, in acoustic studies, to deal with the so-called 'colour' of liquids in very much the same manner as one determines vowel quality i.e. through the measurement of formants.

It is thus possible, for example, to articulate an [l] by raising the center of the tongue toward the hard palate, thus producing what is known as a clear, light, palatal or [i]-coloured [l], '[i]-coloured' because the position of the body of the tongue is basically equivalent to that employed when producing the vowel [i]. Similarly, it is possible to raise the back of the body of the tongue toward the velum and to thus produce a dark, velar or [ʊ]-coloured [l]. As such, it is, of course, possible to produce an [l] with a secondary vowel-like quality (colour) anywhere between these already-mentioned front and back extreme points (e.g. an [ɨ]-coloured [l] would be referred to as palato-velarized in terms of its secondary articulation) as well as with secondary back-vowel qualities lower than [ʊ]. Thus an [l] with [ɔ]-colouring would be classified as uvularized (the tongue dorsum approximates the uvular place of articulation), while an [ɑ]-coloured [l] would be classifiable as pharyngealized: the root of the tongue is retracted to approximate the back wall of the pharynx[5].

As mentioned above, on an acoustic level, the colour of [l] can be approached in a manner similar to that of vowels. The palatal to palato-velarized to velarized articulatory continuum is thus matched, acoustically, by a progressive decrease in the value of the second formant (F2), while back articulations more open than [ʊ] (e.g. uvular and pharyngealized) would translate into a low F2 but a progressive increase in the value of the first formant (F1).

While the reality is, therefore, a continuum of places of articulation and related acoustic effects, "a continuum of productions" in the words of Palethorpe and Cox (2003), the general trend in the literature is, however, to make a basic two-way (allophonic) distinction between 'clear' and 'dark' [l]'s, particularly with respect to English (Huffman 1997: 115-6). According to Recasens

---

[4] A denti-alveolar or even dental place of articulation is also common in some dialects and languages. Note too that while it is recognized that in, for example, English, the /l/-phoneme is rendered as voiceless in some contexts (e.g. in the word *place*), the focus in this article is solely on voiced realizations.

[5] This relatively simple link between vowel-like 'colour effects', on the one hand, and simple vowel-like gestures of the tongue, on the other hand, is the one generally assumed in impressionistic (socio)phonetics (see for example Lass 1990 and Trudgill 2004) but has, in fact, been questioned by modern articulatory research. Simonet (2015: 139-141) reviews three different views on the nature of the secondary articulations of [l], some of which cast the vowel-like articulations overviewed above in doubt. Turton (2014b) also provides ample evidence to suggest that the link between articulation and acoustics in this regard is not uncomplicated; and, of course and as re-confirmed by, for example, More, Shaw, Kawahara & Arai (2018: 75) in relation to liquid articulation in particular, evidence "suggests that speakers use a variety of articulatory strategies to achieve similar acoustic targets". The focus of this research is solely acoustic however and it is not the intention here to embrace any particular view on the link between articulation and acoustic effect.

& Espinosa (2005: 5-6), it is possible to divide, on the basis of the prosodic distribution of these two basic variants of any /l/ phoneme, various languages and dialects into three broad categories:

Type 1: The first category encompasses those varieties which have dark [l] (i.e. [l] with a velar, uvular or pharyngeal secondary articulation) in both syllable-onset (e.g. in *leaf*) and syllable-coda (e.g. in *feel*) position. Languages include Iberian Portuguese, Serbo-Croatian (Simonet 2015: 139), Russian and Polish, while English dialects include Scottish and some American English varieties (Ladefoged & Maddieson 1996: 360-1), the English of Leeds (Carter & Local 2007) as well as (Anglo) Sheffield English (Kirkham 2017).

Type 2: The second category encompasses those varieties which have a generally clear (roughly-speaking a palatalized) [l] regardless of syllable position. Languages include Italian, French, Spanish and German, while English dialects exhibiting this pattern include Irish English, Southern American English and some northern English varieties, such as that spoken in Newcastle (Carter & Local 2007: 185)[6].

Type 3: The third category involves those languages or dialects which present a discernable difference between [l] in onset position versus the same basic segment in coda position i.e. a clear-dark /l/-allophony. Exemplar varieties include Eastern Catalan, some American English dialects (Simonet 2015: 139), Southern British English and Received Pronunciation (RP). In all cases the onset-[l] is discernably clearer than the coda-[l]. With respect to English, the characteristically 'Southern' clear-dark allophony, associated with RP in particular, appears to be a relatively recent one in English. Trudgill (2004: 79), for one, provides evidence to suggest that the relevant pattern was unlikely to be the only input into the development of the various Southern Hemisphere varieties, including SAfE. This variation is implicit in the following quote:

> In Tristanian English … a clear /l/ is usual after front vowels. In the modern Southern Hemisphere varieties, the pronunciation of /l/ in most or all environments in Australasian English tends to be dark, possibly pharyngealised, and the distribution of 'clear' and 'dark' allophonic variants is certainly not as prominent as in many English accents … L Vocalisation[7] is now underway in prepausal and preconsonantal position in New Zealand, but it is obviously a twentieth-century innovation … Falklands Islands English has the English English type of allophony with dark /l/ being rather markedly velarized.

The 'place' of SAfE within this tripartite division is one of the topics of Section 3 below.

2.2 The Phonetics and Phonology of /l/: Complications

This rather simplistic tripartite division is complicated by the fact that what is being dealt with under any particular Type is not necessarily identical across all member varieties. We are, instead, dealing with a continuum of potential articulations that can be 'broken up' differently

[6] Although Recasens & Espinosa (2005: 6) appear to classify Newcastle English (Geordie) under Type 3. A reviewer of this article has also kindly pointed out that South African Indian English (SAIE) has also been reported as falling into the Type 2 category (Bughwan 1970).
[7] See below for a brief description of this phenomenon.

by different varieties. Turton (2014a: 197) concurs that even within English these complications occur: "dialectal diversity has been vastly underestimated in the existing literature on /l/-darkening".

Firstly, there is research indicating that especially in so-called 'clear' varieties – *Type 2* above – the clear [l] in onset position still has a clearer (acoustically a higher F2; articulatorily a slightly more front place of articulation) quality than the clear [l] in coda position. This would also appear to occasionally be true of the dark varieties (*Type 1* above) but not as often – see, for example Carter and Local (2007) for this kind of pattern in Leeds, UK and Turton (2017: 18) who reports on acoustic data for a similar pattern for Manchester. Both Recasens & Espinosa (2005) and Kirkham (2017), however, report on *Type-1* varieties (Catalan and Sheffield English respectively) which show no significant gradient differences between onset and coda-[l].

Secondly, and relatedly, the difference between [l] in onset and coda positions can be the result of either universal co-articulatory pressures (see Sproat & Fujimura 1993)[8] or, alternatively, the differences produced by these articulatory pressures can be subject to language-change due to processes such as phonologisation (Barnes 2006; Beddor 2009; Cho & McQueen 2008; Harrington 2007, 2012; Hyman 1976, 2013; Kirby 2013; O'hala 1981, 1993, 2012) whereby, in terms of the phonetic targeting of the new generation of speakers, the purely phonetic effects of coarticulation or prosodic context is not compensated for and the target changes[9]. Thus it is conceivable that the purely phonetic difference found between onset and coda [l] in *Type 1 & 2* varieties can become the basis for a more substantial dispersion or polarization in phonetic space, via phonologisation, between the two relevant allophones of /l/. The allophones thus become extrinsic as opposed to intrinsic in the parlance of Ladefoged (1965), or non-accommodatory as opposed to accommodatory in the schema of Wells (1982)[10]. In the process a *Type 1* or *Type 2* variety 'turns into' a *Type 3* variety.

On the basis of an extensive cross-linguistic comparison, Recasens (2012) provides a useful metric for determining whether any difference between onset-[l] and coda-[l] in terms of F2 is indicative of *Type 1* or *Type 2* (purely phonetic difference) or *Type 3*. In his own words:

[8] Thus Scobbie & Pouplier (2010: 241) confirm that "the less restricted or "vocalic" gesture … appears to be stronger in coda than in onset position. Further, in terms of inter-articulator timing, the intrinsically less constricted gesture (some form of dorsal retraction), occurs earlier relative to the consonantal gesture when the segment appears in the coda. Concomitant with these factors is an increase in the extent and duration of the acoustic correlates of the dorsal constriction, corresponding to the impressionistic percept of darkness".

[9] But the coarticulatory context remains, leaving the potential for even further phonologisation and change. Thus, in the words of Turton (2017: 1), "speakers may display both categorical allophony of light and dark variants, and gradient phonetic effects coexisting in the same grammar"; so-called 'rule-scattering'. Note that in taking this position we are implicitly agreeing with recent research (especially Turton 2014b) which provides support for the rejection of Sproat & Fujimura's (1993) contention that the difference between onset and coda [l] is (always) a purely gradient effect linked to timing and duration. While it seems this *can* be the case (e.g. in some American English varieties) it needn't be (e.g. in RP, which shows a clear categorical difference between the two allophones of [l]). Another related effect of phonologization is that "phonetic tendencies, promoted by particular environments, become generalized through a process of perceptual compensation and are applied more broadly across a category, which in turn results in wholesale phonological shift" (Holmes-Elliott & Smith 2018: 45), this description of the process being provided in recent research of particular relevance to the current one and which investigates the link between increased /l/-allophony and DRESS-Lowering in a variety of Scottish English.

[10] The notion of /l/-allophony being categorical (extrinsic, non-accommodatory) in English is of course the traditional view in phonology (Chomsky & Halle 1968); the view that Sproat & Fujimura (1993) explicitly challenge.

> It could be then concluded that an F2 difference below 200/300 Hz corresponds to the situation in which initial and final /l/ qualify as phonetically conditioned 'intrinsic' allophones, while an F2 difference about 400 Hz or higher (as in English dialects, Czech and Dutch) is appropriate for a scenario where two distinctive 'extrinsic' allophones are available (Recasens 2012: 377).

Another possible side-effect of phonologisation is increased co-articulatory resistance as investigated, for example, by Simonet (2015)[11]. According to this author there is robust evidence to suggest that one side-effect of the phonologization of coda-[l] qualities in particular is that the resultant "higher degree of "darkness" leads to a higher degree of coarticulatory resistance" (Simonet 2015: 138) meaning, in essence, that the coarticulatory effect of any adjacent vowel is minimized. According to Simonet (2015: 150) this is most likely attributable to "conventionally … enhanced manner requirements" in darker [l] tokens: "dark" /l/ could present more tongue body lowering and post-dorsum backing and raising … because [it] has conventionally enhanced, or phonologized, the manner requirements that apply to all alveolar laterals" (ibid. 150). The greater articulatory resistance for dark-[l] is, in turn, directly explained by these processes of conventionalization and/or phonologization which are known to "reduce the inter- and intra-speaker phonetic variance in the production of phonological categories during sound change (ibid. 150)[12]. Simonet (2015) devises a suitable metric for co-articulatory resistance (CAR henceforth) for his highly controlled Spanish and Catalan data, but one which is unsuited for use in the case of naturalistic speech-data, as collected for the current research. Section 5 below (Methodology) provides more information on the CAR-metric used in the current study.

Another important aspect of Simonet's (2015: 150) results is his finding that the relationship between CAR and 'darkness' is not a binary one (i.e. not CAR or no CAR):

> The findings of the present study, together with those of comparable studies, suggest that there is a certain degree of gradience of both "darkness" in /l/ and coarticulatory resistance in this consonant. Note, for instance, that the present study found a significant linear relation between [retraction] degree in /l/ and coarticulatory resistance.

In effect, the greater the retraction of [l] in any speaker's speech, the greater the degree of CAR.

Moving on to further complications, we note that the secondary quality of [l] is also, potentially at least, subject to a number of other effects. Thus there is research which indicates different qualities for intervocalic onset [l] (Huffman 1997: 116), as compared to [l] in word-initial or word-final position. Even in word-initial onset and word-final coda positions there is also the role played by adjacent consonants (thus, for example, the effect of preceding [p] on both place and voicing features of the [l] in *place*) and given the sonorant nature of [l], a coarticulatory

[11] The actual term Simonet (2015: 141) employs, derived from Hualde, Simonet & Nadeu (2011) is "phonetic conventionalization", which is related to phonologization, but with a greater focus on the "reduction of individual variance in the production of a certain sound or class of sounds or, in other words, a phonetic regression to a social norm" (Simonet 2015: 141).

[12] According to this author this is "conceptually related to the notion of "focusing" used in studies of dialect change and dialect contact (e.g. Kerswill & Trudgill 2005)" (Simonet 2015: 150).

effect of any adjacent vowel nucleus is to be expected[13]. The lateral approximant can also be subject to liaison effects, such that word-final [l] can change its secondary quality if followed by a vowel-initial word e.g. in the phrase *till it*, where a dark [l] (pre-pausally) can in some varieties (e.g. RP) become light before the relevant word-initial vowel via a process of resyllabification. Furthermore, there is also a potential role for morphology in terms of the color of /l/. Lee-Kim, Davidson & Hwang (2013) for example find, in their analysis of New York (State) English, a consistent difference between intervocalic /l/ in pre-boundary (e.g. in *coolest*) and post-boundary (e.g. in *coupless*) condition, with the former being darker than the later, with /l/ in both intervocalic word-medial positions being in turn lighter than /l/ in word-final position (e.g. in *cool*). Turton (2014b) provides the best analysis of the potential role of such factors: her cross-dialectal research confirms that morphosyntactic factors can indirectly play a conditioning role e.g. different dialects showing different patterns for [l] in word-internal position across morpheme boundaries i.e. in words such as *feeling* (where the /l/ belongs to the initial stem-morpheme *feel* but is resyllabified to syllable-initial position when *feel* is combined with the inflectional morpheme *–ing*) some dialects retain a dark [l] while others have a light variant[14].

Dark coda-[l] is also subject, in some varieties, such as Cockney English, to L-Vocalisation, whereby the primary articulation disappears but the vowel-quality remains. Categorical L-Vocalisation effects are also, conceivably, the result of phonologization, given that evidence exists to indicate a phonetic pressure on speakers to weaken the coronal gesture of [l] syllable-finally (Scobbie & Pouplier 2010: 241). Potential L-vocalisation is, however, not the subject of further investigation in this study, firstly because it has not been reported on for SAfE[15] and, secondly, because L-vocalisation is difficult to detect using a purely acoustic approach (see Turton 2017: 16).

3. /l/ in SAfE: The Impressionistic Literature

The retracting and lowering effect of coda-/l/ on preceding vowel quality in SAfE is generally conceded (Bekker 2009: 412-423; Lanham 1967: 64-7, 1978: 149, 1982:338; Lanham & Macdonald 1979: 43; Lanham & Traill 1962: 34-5;Wells 1982: 617), often leading to neutralization e.g. homophonous *elf* and *Alf*. In the case of the colour of /l/ itself, however, there is a lack of agreement[16].

---

[13] While the potential effect of adjacent consonants is recognized here, it will not be explored in this study given the large amounts of data which have allowed us to exclude such contexts and the fact that, as emphasized by Morris (2017: 191), "the influence of neighbouring consonants is less clear than that of syllable position". As mentioned before, voiceless /l/ is excluded from analysis in this research, in principle and also as the result of a broader focus on singleton /l/'s not adjacent to consonants (see the Methodology section for more).

[14] Given the complications in this regard, extensively investigated in Turton (2014b), these indirect morphosyntactic effects will not be explored in the current research; the current research will only focus on singleton /l/'s in word-initial and word-final position (see the Methodology section). Future research focused specifically on such morphosyntactic effects is planned.

[15] The one exception is Bailey (1984: 21), who claims L-vocalization for his own idiolect of SAfE, particularly in casual speech. In contrast, Lass (2004: 278-9) claims that final [ɫ] only vocalizes in "extremely fast speech, and even there rarely". As intimated above, more (articulatorily-driven) research needs to be done on this topic. One of the reviewers of this article has also kindly pointed out that such L-vocalization is also common in many varieties of African English (outside of South Africa).

[16] It seems SAfE is hardly the only variety of English about which there is disagreement in this regard. Kirkham (2017: 20), for example, has the following to say about Sheffield English: "Sheffield Anglo English is generally considered to have dark /l/s, similar to that described for Leeds by Carter & Local (2007). However, in their

While some more recent authors, such as Bowerman (2004: 940), have taken the classic clear-dark /l/-allophony in SAfE for granted, the relatively early Lanham & Traill (1962: 34) and Lanham (1967: 65 & 98) conclude otherwise. Firstly, Lanham & Traill (1962: 34) claim that, while their 'SARP 'A''[17] displays a typical RP-like clear-dark /l/-allophony, that "a strong tendency exists … in SAE towards a weakening of the velarisation and 'dark l' is often not discernable in expected environments". Curiously, these authors link the weakening of velarization in post-nucleus (tautosyllabic) /l/ to the backing of preceding vowel quality. Lanham (1967: 65 & 98) explains that /l/ in SAfE is *clear* in all prosodic positions, the retraction of the various vowels before syllable-final /l/ being explained by the 'migration' of the /ʊ/-like quality from the /l/ to the nucleus: "a feature of /l/ influence in SAE is that the "dark" quality of the consonant is almost entirely lost, having passed to the preceding vocoid leaving a "clear" [l]. "Clear" [l] is the normal allophone of /l/ in all positions in most forms of SAE" (Lanham 1967: 65). Wells (1982: 617) effectively restates this assessment by asserting that "South African /l/ is not really dark in any environment". According to this author, /l/ is always clear or neutral in SAfE (Wells 1982: 616). Trudgill (2004: 79) relies on Wells' (1982) description of SAfE /l/ as part of his broader analysis of /l/ in Southern Hemisphere Englishes.

It is in Lass (1990: 284, footnote 8) that we find the first dissenting voice. The author claims as follows:

> According to Wells (1982: §8.3.6), SAE /l/ 'is not really dark in any environment'; but this is not true of the variety discussed here, nor any type that I am familiar with. What are sometimes perhaps taken as 'clear' /l/ are simply ones with co-articulation of a less than fully back quality … in Cape Town standard, /l/ is typically very clear (palatalized) syllable-initially and in interludes (*silly, follow*), and with some backer co-articulation in codas: normally palato-velarized or velarized ([ɨ] to [ɤ]-coloured) after high vowels and uvularized ([ɔ] or [ʌ]-coloured) after lower ones.

Lass (1995: 102) adds some further comments on this matter: for BrSAfE and GenSAfE speakers (and most CulSAfE speakers) initial and intersyllabic /l/ is "neutral or slightly palatalized", with the latter being more common "among younger female Respectable[18] speakers". Final /l/ is dark, either velarized or uvularized. According to Lass (2004: 278-9), "final /l/ may be very dark (often uvularized or pharyngealized, even after front vowels) … /l/ is clear syllable-initially, rather palatalized in posher varieties, regardless of the following vowel". Bowerman (2004: 940) confirms the above, adding that "when /l/ occurs at the end of a word, but before another word beginning with a vowel, it tends to be realized as clear in Cultivated SAE"; but not, by implication, in other SAfE sociolects.

auditory description of Sheffield Anglo English, Stoddart, Upton & Widdowson (1999: 676) claim that '[l]aterals are normally clear, but dark [ɫ] is found occasionally in final position'. This claim contrasts with more recent acoustic evidence from a study of present-day Sheffield (Kirkham 2003)"; and with the results of Kirkham (2017) itself. The author also points out that "it is not obvious whether this represents generational change or transcriber perceptions" but suggests that "/l/ … in … Sheffield Anglo English … has, therefore, potentially become darker over successive generations" (Kirkham 2017: 31).

[17] Loosely-speaking, Lanham & Traill's (1962) 'SARP-'A'' variety corresponds to CulSAfE.

[18] That is GenSAfE speakers.

In summary there is disagreement in the impressionistic literature as to whether SAfE is a *Type 2* or a *Type 3* variety. The focus of this disagreement is basically about the color of coda-/l/ i.e. whether it is clear or dark.

4. Preliminary Discussion and General Hypotheses

Reading the above scattered and, in one important respect contradictory, remarks on /l/ in SAfE in the light of the reviewed cross-linguistic literature on these liquids raises a number of possible avenues of investigation, all of which would, we believe, benefit from a modern acoustic (and sociophonetic) approach and which have been converted into the following general hypotheses:

I. *General Hypothesis 1*: Firstly, and most importantly, the discrepancy/disagreement in the literature between Lanham & Traill (1962), Lanham (1967), Wells (1982) and Trudgill (2004), on the one hand, and Lass (1990, 1995, 2004) and Bowerman (2004), on the other, needs to be resolved – on the understanding of course that the answer might simply be that one group of linguists is mistaken. More to the point, however, is the possibility that SAfE has undergone language-change i.e. from a *Type-2* variety (with clear-/l/ in all positions) into a *Type-3* variety (with clear-dark /l/-allophony). Given that *Type-2* varieties also often display a purely phonetic difference in color between /l/ in onset and coda position, it is likely that any putative change would have, in effect, involved the phonologization of the two intrinsic allophones into extrinsic allophones, with subsequent polarization in phonetic space. If this hypothesis regarding language-change is correct we would expect a significant difference in this regard between older speakers (possibly *Type 2* speakers) and younger speakers (possibly *Type 3* speakers).

II. *General Hypothesis 2*: The same type of difference would apply in the case of co-articulatory resistance i.e. if there is an increased difference between onset and coda-/l/ in terms of Hz (and if this increased difference is at least partly the result of diachronic backing of coda-/l/ color[19]), then we would expect to see a greater degree of co-articulatory resistance (CAR) among younger speakers; in practice we would expect to see a decreased co-articulatory effect of preceding vowel quality on coda-/l/ color.

III. *General Hypothesis 3*: The remarks by Lass (1995, 2004) concerning the higher degree of palatalization of onset-/l/ among young female Respectable (e.g. GenSAfE) speakers would benefit from independent confirmation. This would also help to determine the source of any phonetic polarization captured under the investigation of *General Hypotheses 1* and *2* above i.e. whether such polarization is a result of further backing of coda-/l/, fronting of onset-/l/; or both.

In the next section, apart from dealing with general methodological issues, the general hypotheses just provided will be operationalized in terms of providing exact details of measurement and testing.

[19] Taking into account the possibility that any putative phonetic polarization could equally have been the result of an exclusive fronting of the initial-/l/ e.g. from a palato-velarized (neutral) to palatalized position; this possibility is linked to Lass' (1995, 2004) comments regarding increased palatalization among younger female GenSAfE speakers (see next bullet point). More likely of course is that both allophones of /l/ 'moved'. Another possibility is that coda-/l/ moved exclusively from a relatively clearer to a relatively darker position.

5. Research Methodology

The results reported on in the next section are based on an acoustic analysis of the speech of 50 white L1-GenSAfE speakers, all of whom have spent the vast majority of their lives in the broader Cape Town area in the southwest corner of South Africa (see Figure 1 below)[20].

The relevant speech-data was collected as a result of Labovian-type sociolinguistic interviews which were conducted during the periods 2013-2015 and 2016, in the first period as the basis for Chevalier (2016), in the second period as a means of collecting supplementary data for the purposes of the current article[21]. Given that much research on /l/ cross-linguistically has been conducted under laboratory conditions it was also felt that the use of naturalistic speech would constitute a welcome addition to the body of literature on this topic. The majority of the interviews were recorded in MP3 format (320 bit rate, 44.1 kHz sample rate), using a Marantz (PDM661 MKII) recorder. The relevant recordings were subsequently converted to 16 bit .wav format.

The age of the speakers ranged from 18 to 82 and they were both male and female. The average age of the speakers was 30 with the oldest speaker born in 1934 and the youngest speaker born in 1995. There were 23 males and 27 females in the sample. As mentioned above, this research was restricted to speakers of GenSAfE (as opposed to BrSAfE or CulSAfE): all subjects were thus of middle-class status and had been to either private or former Model C schools[22]. Most were engaged in tertiary education at the University of Cape Town. All subjects self-described as white.

[20] We should note at this point that the results of this research are thus directly comparable to the claims contained in Lass (1990) which was also focused on GenSAfE in Cape Town.

[21] While Chevalier (2016) was focused on another topic (the front short vowels of SAfE), the data collected was suitable for an analysis of /l/. The supplementary data was specifically focused on the collection of data from relatively older speakers; the methodology and overall approach was identical to that used in the first period.

[22] That is schools that were reserved exclusively for white individuals during the apartheid period. At the risk of overgeneralising, it is the case that these schools provide a higher quality of education (and are frequented by wealthier individuals of all races) in post-apartheid South Africa than other government schools. None of the subjects displayed any of the shibboleths typical of either BrSAfE or CulSAfE e.g. obstruent-r in the case of the former, unrounded NURSE in the case of the later.

Figure 1: Map of South Africa showing Cape Town

All the recorded interviews were transcribed and each acoustic record (.wav file) was subject to forced alignment with its relevant transcription using the *Forced Alignment and Vowel Extraction (FAVE)* suite (Rosenfelder, Fruehwald, Evanini & Yuan 2011). With respect to /l/, a basic division was made between /l/ in absolute word-initial and absolute word-final position:

- /l/ in absolute word-initial position (e.g. in *lift*); /l/-tokens in the word-initial onset but preceded by a (tautosyllabic) consonant (e.g. in *fleece* or *place*) were not included[23].
- /l/ in absolute word-final, coda position (e.g. in *fall*); here /l/-tokens followed in the coda by a consonant (e.g. in *felt*) were excluded as well as word-final /l/'s prone to liaison effects (e.g. in *fall in*). The word-final /l/ therefore needed to be either utterance-final or preceding a consonant in the following word (e.g. in *feel terrible*)[24].

Within the FAVE suite, formant prediction was conducted using the LPC formant prediction algorithm and formant extraction (F1 and F2) was performed at the one-third time stamp. Where alignment via FAVE clearly failed some hand-adjustment was required. Subsequent to formant extraction, the data for each subject underwent Lobanov-normalization (Lobanov 1971), subsequently recalibrated in Hz-values, again using FAVE functionality.

The data was then subject to a number of statistical procedures in order to allow for a full exploration of the interrelationships between acoustic variables on the one hand and social variables on the other: linear mixed-effects regression (lmer) modelling via the {lmerTest} R-package (Kuznetsova, Brockhoff & Christensen 2017), linear modelling (lm), again in R; and a conditional inference tree (ctree) approach (Hothorn, Hornik & Zeileis 2006). The social

[23] In the process /l/-tokens potentially subject to devoicing effects (e.g. in *place*) were also automatically excluded from analysis.

[24] In the case of potential /l/-liaison effects we do recognize, following Scobbie & Pouplier (2010) that matters are more complicated than a simple ternary division between a pre-pausal, pre-vocalic and pre-consonantal context. For the purposes of this article, however, we decided that a restriction to word-final, pre-pausal or pre-consonantal context would suffice to capture overall trends in terms of the positional allophony of /l/ in SAfE.

variables in question are age and gender while the acoustic variables are F1, F2 (and F2-F1) and CAR (coarticulatory resistance). CAR was operationalized as inversely proportional to standard deviation i.e. the greater the deviation from its mean of any speaker's or group's /l/ the lesser the CAR; and vice-versa[25]. As discussed above, there is evidence in the literature for a significant relationship between increased darkening and increased CAR. The various general hypotheses given in the previous section can now be formulated in a more precise fashion:

I. With respect to *General Hypothesis 1*, if a change of *Type 2* to *Type 3* has occurred, via phonologization, we would expect to find (a) a cohort of relatively younger speakers with an F2 difference between /l/-allophones higher than 400 Hz (*Type 3*) in contrast with a cohort of relatively older speakers displaying an F2 difference of less than 200/300 Hz (*Type 2*), as per the metric provided by Recasens (2012). Furthermore, more generally we would (b) expect to find an inverse correlation between the difference between /l/ in onset and coda-position on the one hand and age on the other i.e. the younger (lower) the age the larger the difference between /l/ in onset and coda position (i.e. the putative allophonic polarization attendant upon phonologization). In the case of (a), Recasens (2012) only focuses on F2-difference and this metric will thus remain the basis of comparison. In the case of (b), however, it was decided that, in recognition of the fact that /l/-darkening can also involve lowering (e.g. the difference between velarized and uvularized /l/)[26], that the difference in F1 would also be factored in, via the use of F2-F1 as an overall measure of colour: "some studies have taken F2-F1 as a measure of clearness/darkness, with higher values suggesting clearer realisations" (Kirkham 2017: 18).

II. Relatedly, if there is an inverse correlation between age and increased phonetic polarization – and assuming that this phonetic polarization was actuated at least in part by increased backing of coda-/l/ - then we would expect a negative correlation between F2-F1 and CAR (the clearer the /l/ sound the lower the CAR) and thus – given that CAR and standard deviation 'move' in opposite directions – a positive correlation between F2-F1 and standard deviation (SD) i.e. the higher the average F2-F1 of the coda-/l/ sounds of a speaker or a group of speakers the greater the SD.

III. With respect to *General Hypothesis 3*, we would expect a negative correlation, among women in particular, between age and the F2-F1 value of /l/ in onset position i.e. the younger the female speaker of GenSAfE, the more palatalized their onset-/l/.

All of the above hypotheses are focused mainly on the interrelationship between F2-F1 or CAR/SD and age, except in the case of *General Hypothesis 1(a)* in which F2 alone is considered

[25] Using standard deviation in this way to determine CAR seems to make good sense: if there is greater coarticulatory resistance in the production of a vowel-like sound like /l/ then the quality of that sound (i.e. its position on the F1/F2 formant chart) should remain relatively stable and focused, with less deviation and variation around the mean. The opposite applies when there is less CAR i.e. when the coarticulatory effect of preceding vowel quality causes a large degree of variation (deviation) in the quality of the adjacent /l/.

[26] "Generally speaking, clear liquids have high F2 and low F1, while dark liquids have low F2 and high F1" (Kirkham 2017: 18). See the recent Holmes-Elliott & Smith (2018) where L1-difference plays the most important and perhaps only role in what seems, arguably, to be a change in the Buckie dialect in northeast Scotland from a Type-1 dialect (dark /l/ in all positions) to a Type-3 dialect (clear-dark /l/-allophony). See also Lee-Kim, Davidson & Hwang (2013: 498) who in their research find that "raising of F1 … can emerge as a primary acoustic correlate of a darker [ɫ] depending on the specific vowel contexts".

and *General Hypothesis 3*, in which case gender is also expected to be a contributing factor. It remains however to be seen whether or not gender has a role to play in relation to any of the other hypotheses, especially given the commonly-accepted role that women play in language-change.

A further methodological challenge relates to the necessity of providing liquid ‘colour’ with a reference point, given that Hz-values do not, in and of themselves, provide obvious clues in this regard. Although Recasens (2012) does provide broad Hz-‘bands’ for clear (1500 – 2000 Hz) and dark (800 – 1200 Hz) /l/, based on extensive cross-linguistic evidence, it was felt best to supplement Recasens’ (2012) ‘bands’ with vowel-data from the subjects themselves. In the following results section, therefore, the relevant acoustic vowel chart (see Figure 3) is provided inclusive of vowel-quality in order to provide a more accurate sense of relative /l/-color. The FLEECE, GOOSE, FOOT, THOUGHT, TRAP and BATH vowel-data was used for this purpose. [27]

6. Results

This section provides the results of the acoustic analysis and the application of the various statistical procedures described in the previous section. In the next section (6.1.) we begin with an overall exploration of the results, beginning with an examination of the results of the linear mixed-effects modelling with F2-F1 (i.e. the color of /l/) as the dependent variable (6.1.1.). From 6.1.2 onwards c-tree analysis is used to supplement the linear mixed-effects modelling in terms of exploring the effects of prosodic position (6.1.2.), age (6.1.3.) and gender (6.1.4.) on F2-F1. Following this, in 6.2., we move to an exploration of the *difference* between initial and final /l/ in terms of F2 (i.e. the difference in F2 between onset and final-/l/ becomes the dependent variable), while in 6.3. results relating to co-articulatory resistance are provided.

6.1 F2-F1 (approximant colour) of /l/

6.1.1 Results of the linear mixed-effects model

Given that the data for /l/ colour involved repeated measures (numerous tokens of /l/ from the same subject and sometimes from the same word) the application of linear mixed-effects modelling was appropriate. For the initial fully-saturated model the dependent variable was set as Colour (defined as F2-F1), fixed-effects were set as Context (initial or final), Age[28] and Gender while the random-effects were set as Subject and Word (cross-random effects). The intercept was based on the following values: {final} and {female}. The (step) function of the {lmerTest} R-package (Kuznetsova et al. 2017) was then used to eliminate nonsignificant factors. Our interpretation of the data is thus based on the best-fit models and within factor-level contrasts based on differences of least square means. Table 1 below presents the best fit of the stepped lmer model for Colour-values and shows the factors and their within-factor level contrasts selected as significant by the model.

[27] These are a selection of Wells’ (1982) well-known lexical sets for English vowels.
[28] Defined as the age of the subject in 2018.

Table 1: Best-fit linear mixed-effects model for (normalized) F2-F1

FIXED EFFECTS	ESTIMATE	SE	*T*	*P*-VALUE
(INTERCEPT)	463.88 Hz	16.73	27.73	< 0.001
CONTEXT (INITIAL)	336.01 Hz	11.21	29.99	< 0.001
AGE	1.76 Hz	0.36	4.91	< 0.001
SEX (MALE)	36.94 Hz	12.00	2.84	< 0.01
CONTEXT (INITIAL): SEX (MALE)	-70.80 Hz	8.70	-8.14	< 0.001

NO. OF OBSERVATIONS: 8660; GROUPS: WORD (678, SD=89.88), SPEAKER (50, SD=41.49)

In a subsequent ANOVA test on the model-data the results as provided in Table 2 were obtained:

Table 2: ANOVA of the best-fit linear mixed-effects model for (normalized) F2-F1

	Sum Sq	Mean Sq	NumDF	DenDF	F.value	Pr(>F)	Significance
context	31070267	31070267	1	937.2	853.3180	< 2.2e-16	***
age	877737	877737	1	43.2	24.1063	1.349e-05	***
sex	554	554	1	43.6	0.0152	0.9024	
context:sex	2415025	2415025	1	8594.1	66.3266	4.356e-16	***

Here we see that the significance of context, age and the interaction between context (initial) and gender remains, but that the *overall* significance of gender falls away.

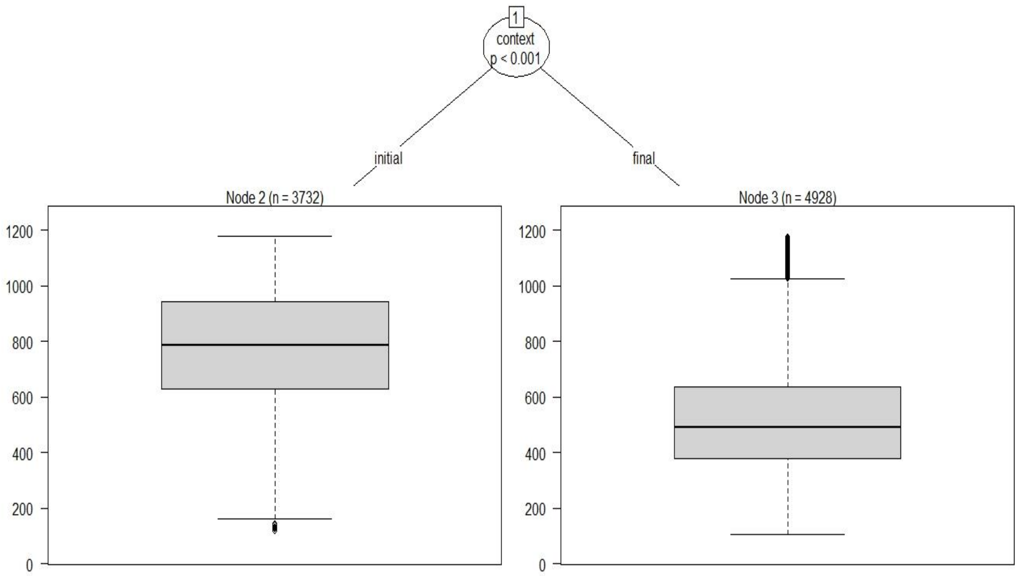

Figure 2: Portion of c-tree graph showing basic, initial split across initial and final-/l/ contexts

6.1.2 Initial vs. Final /l/

As per the linear mixed-effects model and the subsequent ANOVA, as provided in Tables 3 and 4, initial-/l/ in SAfE is clearly and significantly different from final-/l/ (p < 0.001). A c-tree analysis based on the same factors (i.e. context, age and gender) provided an initial binary-split on the basis of context (i.e. initial vs. final). Figure 2 provides this initial section of the c-tree.

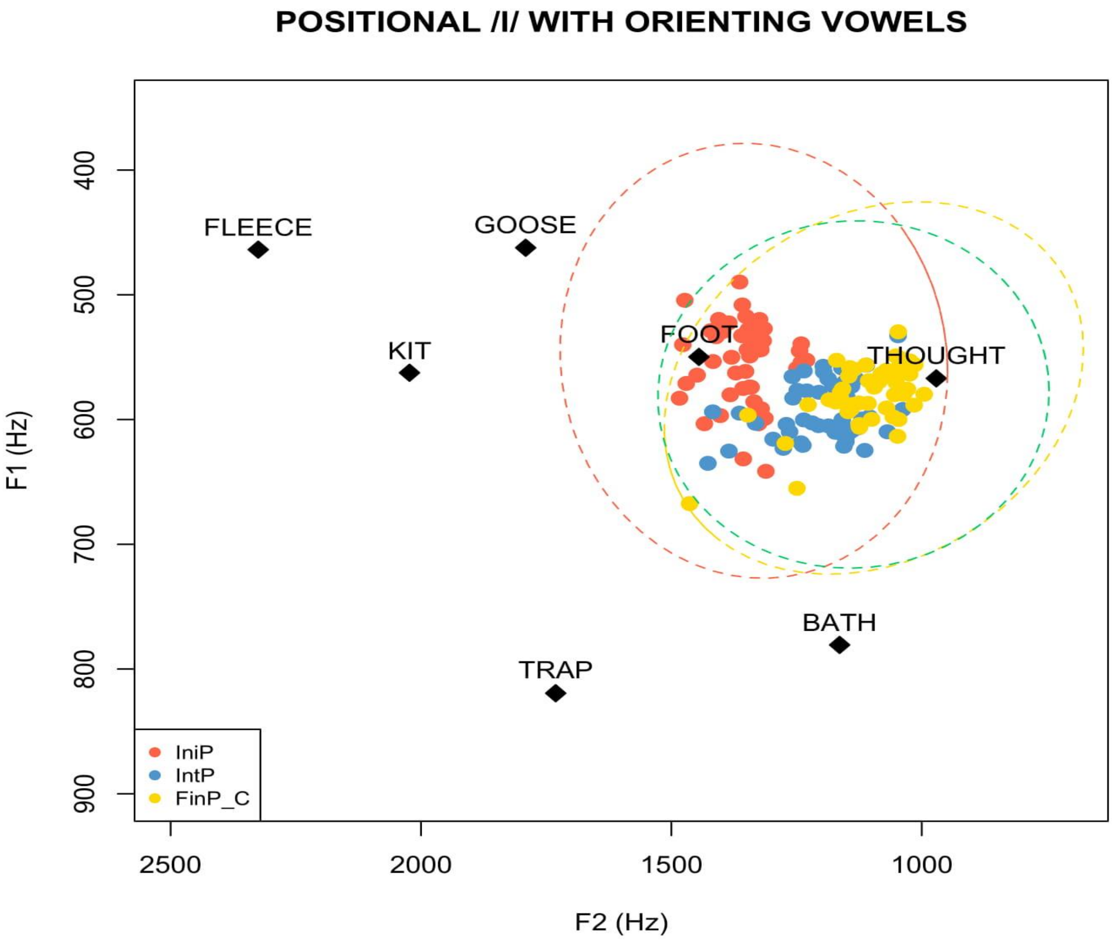

Figure 3: Overall acoustic results for the two main /l/ positional variants; N=8660. This vowel chart is based on the means and standard deviations (x2) of each subject for each /l/-position. IniP = absolute word-initial /l/ (in salmon shading); FinP_C = absolute word-final /l/ (in yellow shading). IntP (in blue shading) refers to word-medial /l/, the focus of possible future research. The overall means for a number of vowels from the same data-set have been included to give a sense of the colour of the two positional variants of /l/.

In Figure 3, we note the colour of the two main /l/ allophones within the context of an acoustic vowel chart, along with orienting vowels from the same data-set. For the various statistical tests as well as for the acoustic vowel chart, an overall number of 8660 tokens were analyzed, 3732 tokens for initial /l/ and 4928 tokens for final /l/[29]. The reader is reminded that the results are

[29] In Figure 2, data for word-internal /l/ is also represented (in blue and referred to in the rubric as "IntP"); this data can be ignored for the purposes of the current article.

based on Lobanov-normalized (and recalibrated to Hz) F1 and F2 values for all relevant tokens. As mentioned, Figure 3 also includes the means of a number of vowels (see end of previous section) from the same data-set in order to provide a sense of relative /l/-colour. The vowel and /l/-data are derived from all tokens from all speakers. In the case of the vowels, the means for all tokens for all speakers are provided, while in the case of the /l/ positional allophones the mean for *each* speaker for *each* positional allophone is provided. Ellipses provide a graphic illustration of the standard deviation (x2) across all speakers per positional allophone. The mean F2 (normalized) values for initial and final /l/ are 1335Hz and 1096Hz respectively, while the F1 (normalized) values are 553Hz and 575Hz respectively.

Importantly, we note that word-final /l/ (in yellow shading) is clearly darker than word-initial /l/ (in salmon shading), both in terms of a lower F2 and a slightly higher F1. The most striking thing about Figure 3, however, is the clear evidence of the *overall* dark quality of *both* positional allophones of /l/; even word-initial /l/ is neutral at best in terms of its colour i.e. given that FOOT does show some degree of centralization in SAfE (see Bekker 2009 and Chevalier 2016). Final /l/ appears to have a generally uvularized, [o]-like[30] quality. Recasens (2012: 369) gives 1500-2000Hz for F2 as a broad definition for clear /l/ and 800-1200Hz for dark /l/. On this basis, final /l/ (1096Hz) in SAfE is dark and initial-/l/ (1335Hz) can best be characterized as neutral; perhaps unsurprisingly very similar to the value provided by McDougall & Jones (2011) for their 'neutral' world-initial /l/ in Australian English i.e. 1398Hz. We note Trudgill's (2004: 79) remark again that "the pronunciation of /l/ in most or all environments in Australasian English tends to dark … and the distribution of 'clear' and 'dark' allophonic variants in certainly not as prominent as in many English dialects".

6.1.3 The effect of age on /l/-colour

The linear mixed-effects model and the subsequent ANOVA, the results of which are provided in Tables 3 and 4, provide age as a main significant effect ($p < 0.001$). As age increases so does F2-F1 (i.e. the older the speaker the lighter the color). This speaks to an overall darkening of /l/ in SAfE over time. Using c-tree analysis as a basic test of significance (i.e. running the data with only one contributing factor, Age) we see this general trend represented in Figure 4. Note that this c-tree analysis divides the subjects into two groups: those above the age of 60 and those 60 years of age and under. The same basic trend is seen within both the initial and final-/l/ data, as predicted by the linear mixed-effects model given that it does not show any significant interaction between context and age. This lack of interaction can also be seen in graphic form in Figure 5, which provides the results of a c-tree analysis of the effects of context *and* age on /l/-color.

[30] i.e. THOUGHT-like, with SAfE generally having a raised [o:] quality for this lexical set.

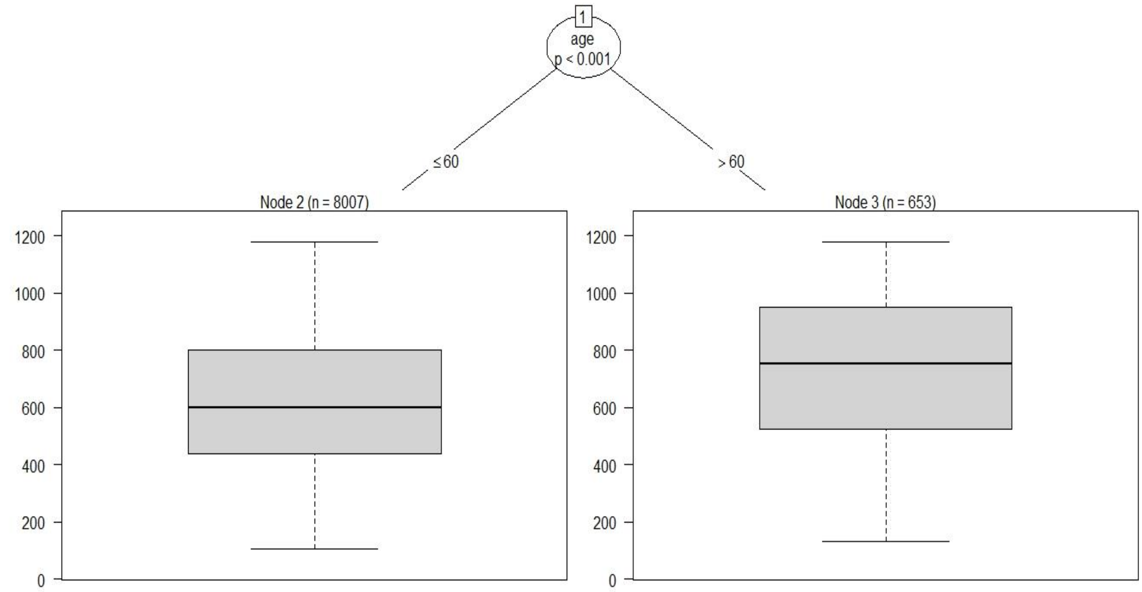

Figure 4: A c-tree graph showing basic effect of age on F2-F1

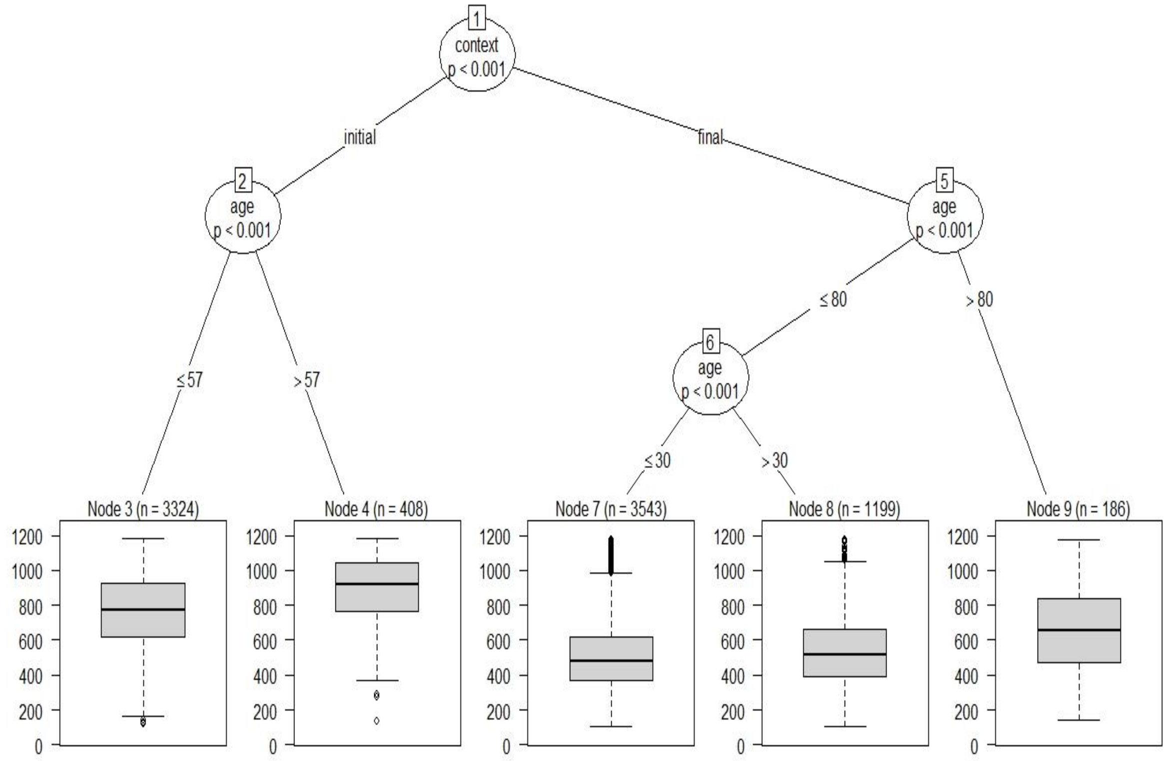

Figure 5: A c-tree graph of the effect of context and age on F2-F1

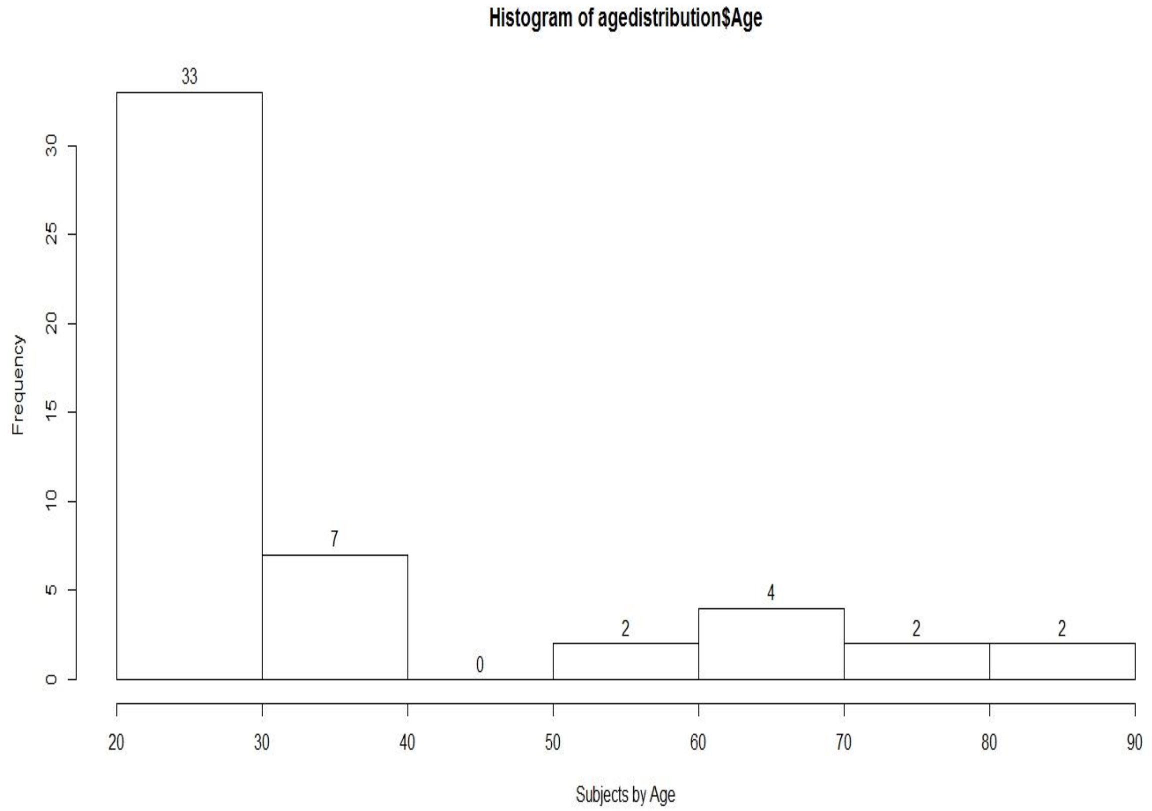

Figure 6: Basic distribution of subjects by age

There is thus a clear age-effect for both initial and final-/l/; for both contexts the older the speaker the clearer the realization of /l/. We see too that this c-tree analysis breaks up the subjects into a number of different age groups depending on the context. Thus from this analysis one might wish to conclude that progressive /l/-darkening in SAfE first began with final-/l/ in the speech of the second oldest group of subjects (i.e. those between the ages of 31 and 80[31]); such darkening then spread to initial-/l/ in the next generation (i.e. those 57 or less years of age[32]). Finally, even younger speakers (those 30 or less years[33]) took the process of darkening final-/l/ even further. Such a conclusion should, however, be accepted with some caution given the comparatively fewer older speakers interviewed. Figure 6 shows us the basic distribution of the 50 subjects in terms of age. As can be seen there are 40 subjects who are 40 years or less (henceforth the Young cohort) and 10 subjects who are over 40 years (henceforth the Old cohort). Thus while the finer details perhaps require further corroboration, the overall trend is clear-enough: the younger the speaker the darker the color of /l/ irrespective of whether the /l/-token is in initial or final position. The two positional allophones thus darken together and there is no polarization in phonetic space. For initial-/l/ the mean F2 and F1 values for the Old cohort are 1433 Hz and 557 Hz respectively (with a mean F2-F1 value of 876 Hz) while for the Young cohort the relevant values are 1323 Hz, 552Hz and 770Hz respectively. With respect to final-

[31] That is born between 1938 and 1980.
[32] i.e. born in or after 1961.
[33] i.e. born in 1988 or after. As pointed out correctly by one of the reviewers the actual ages provided by the c-tree analysis are somewhat artificially precise; it is important to thus recognize that this analysis only provides a model of what is, in reality, probably a much more complex and overlapping set of age-cohorts.

/l/ the mean F2 and F1 values for the Old cohort are 1176 Hz and 593 Hz respectively (with a mean F2-F1 value of 583Hz) while for the Young cohort the relevant values are 1083 Hz, 572 Hz and 512 Hz respectively. Here again we see the clear overall effect of age on /l/ in SAfE – the younger the speaker the darker the /l/ irrespective of context.

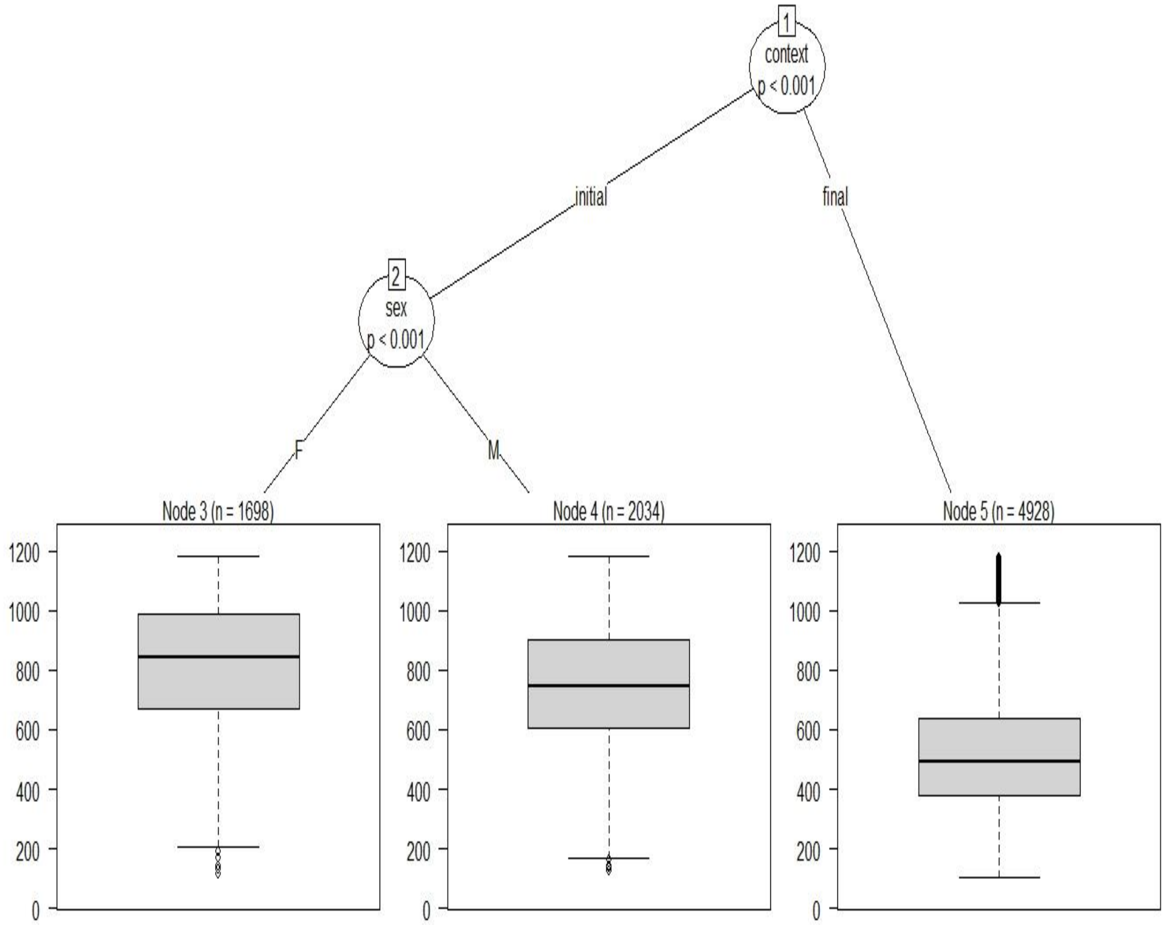

Figure 7: A c-tree analysis of the effect of context and gender on /l/-color (F2-F1)

6.1.4 The effect of gender on /l/-colour

The linear-mixed model specifies gender as a main effect, although at a slightly lower degree of significance ($p < 0.01$) than context and age ($p < 0.001$). The ANOVA, however, excludes the overall effect of gender and only highlights the interaction between context and gender alone ($p < 0.001$): in effect we would thus expect only initial-/l/ to display gender effects with women showing a higher F2-F1 value (i.e. a lighter, more palatal[34] initial-/l/). A basic c-tree analysis using only context and gender as factors, and as provided graphically as Figure 7, supports this analysis: it shows no significant difference between men and women with respect to final-/l/ but such an interaction is clearly present in the case of initial-/l/. The mean F2, F1 and F2-F1 values for initial-/l/ among women was 1358Hz, 538Hz and 820Hz (N= 1698 across

[34] Only more palatal relatively-speaking; as has already been shown initial-/l/ in SAfE is no more front than neutral.

27 subjects). In the case of men, the values are 752Hz (N= 2034 across 23 subjects) for mean F2-F1 and 1317Hz and 565Hz for mean F2 and F1 respectively. For final-/l/ the values for F2, F1 and F2-F1 among women are 1087 Hz, 571 Hz and 516Hz (N=2668) while for men the values are 1106 Hz, 579 Hz and 527 Hz (N = 2260).

6.2 The difference between initial and final-/l/

The mean F2-difference between initial and final-/l/ in the data is 256.5 Hz, while the F2-F1 difference is 270Hz. In the case of the F2-difference there are no cases above 400Hz and thus, in terms of Recasens' (2012) metric, no evidence of extrinsic allophony. There was one subject, a women of 62 years of age, who effectively had no difference between initial and final-/l/: -30 Hz in terms of F2-difference and 35 Hz in terms of the F2-F1 difference.

Given the fact that, with respect to these two metrics, there were no repeated measures (i.e. there was only one measurement per speaker) a basic linear effects model was run. The (step) function was run again and the results for F2-difference were as provided in Table 3.

Table 3: Results of a linear effects model on the effects of gender on F2-difference between initial and final-/l/ (N=50)

FIXED EFFECTS	ESTIMATE	SE	*T*	*P*-VALUE
(INTERCEPT)	268.70 Hz	15.49	17.35	< 0.001
GENDER (MALE)	-51.75 Hz	22.83	-2.266	< 0.05

In a subsequent ANOVA test on the model-data the results as provided in Table 4 were obtained:

Table 4: ANOVA of the best-fit linear effects model for F2-difference

	Df	Sum Sq	Mean Sq	F.value	Pr(>F)	Significance
gender	1	33258	33258	5.1365	0.02797	*

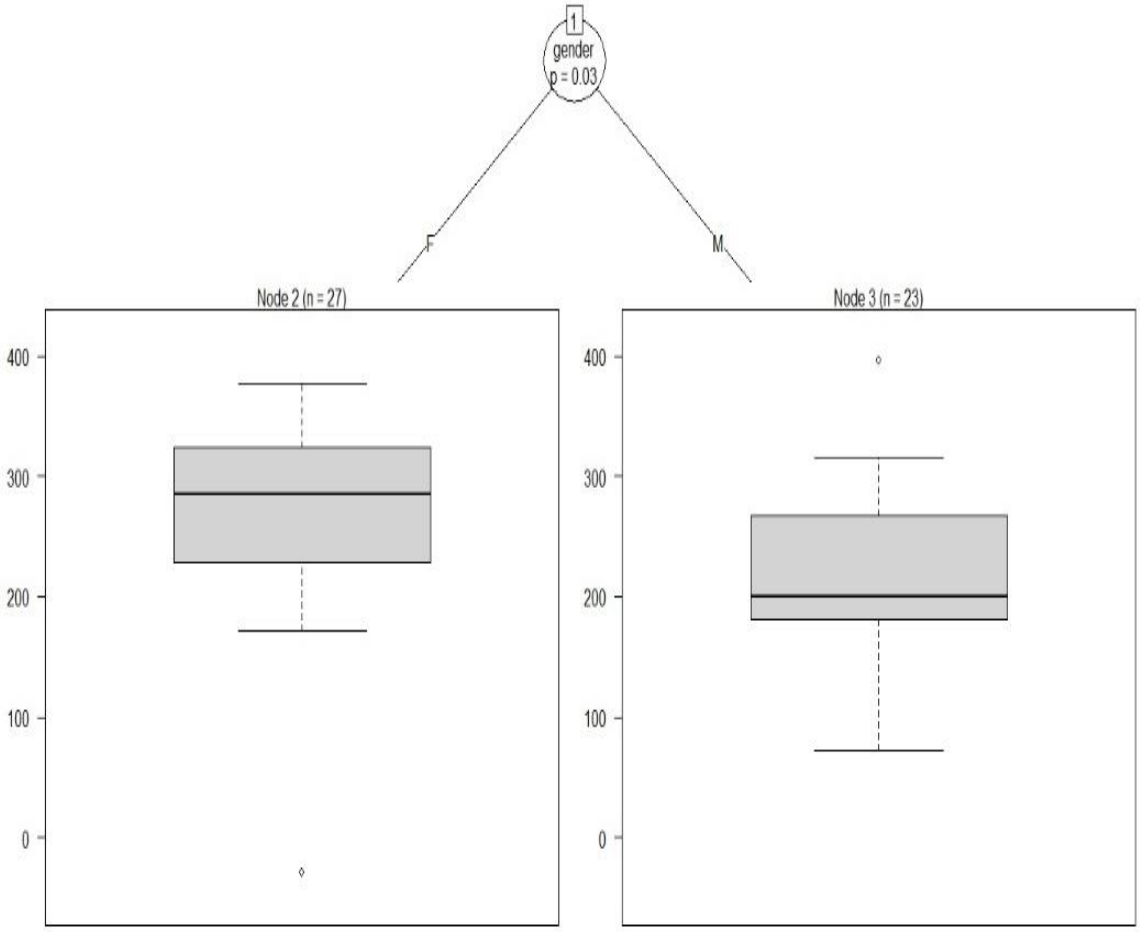

Figure 8: A c-tree of effect of gender on F2-difference (N=50)

Gender is thus of some significance with respect to the degree of polarization in the data, with men showing less polarization that the women. Of the 27 women subjects, 12 subjects had F2-difference values greater than 300 Hz (but still less than 400 Hz), while only two men (out of 23) had F2-difference values within this range. This makes sense, given the evidence provided in the previous section for the greater palatalization of initial-/l/ among women along with little to no evidence for a similar difference with respect to final-/l/. In other words, while men and women, all else being equal, retain roughly the same degree of darkness with respect to final-/l/, women, overall, show a relative degree of fronting with respect to initial-/l/, leading in turn to relative overall polarization of the two /l/ allophones compared to men. A c-tree analysis of the combined effects of both age and gender shows no significant effects and the same applies to age alone. A c-tree analysis focused solely on the effect of gender on F2-difference does however show a significant difference, as illustrated in Figure 8. In terms of the raw Hz-values the mean F2-difference for women is 269 Hz while for men it is 217 Hz. The same basic pattern with respect to the linear modelling, the ANOVA and the c-tree analysis repeats itself with respect to the F2-F1 difference between initial and final-/l/.

6.3 Co-articulatory resistance (CAD)

As mentioned earlier, co-articulatory resistance has been operationalized as inversely proportional to standard deviation. A linear model was run to establish whether there was a correlation between the degree of darkness of final-/l/ (i.e. F2-F1) for each subject and the standard deviation of the darkness of final-/l/ for each subject (i.e. N = 50); and to also establish whether gender and age interacted in any particular manner with the data. The (step) function was run again, only F2-F1 of final-/l/ and gender were retained as effects and the results for CAD (i.e. standard deviation) were as provided in Table 5.

Table 5: Results of a linear effects model on the effects of gender and color (F2-F1) of final-/l/ on the CAD (operationalized as SD) of final-/l/ (N=50)

FIXED EFFECTS	ESTIMATE	SE	*T*	PR(>|T|)	*P*-VALUE
(INTERCEPT)	54.92579 Hz	32.33143	1.699	0.096	.
FINAL-/L/ (F2-F1)	0.27422	0.06031	4.547	3.82e-05	***
GENDER (MALE)	13.96440	9.04905	1.543	0.129	

Table 6: ANOVA of the best-fit linear effects model for final-/l/ CAD

	Df	Sum Sq	Mean Sq	F.value	Pr(>F)	Significance
Final-/l/ (F2-F1)	1	21889	21889.1	21.6008	2.738e-05	***
gender	1	2413	2413.2	2.3814	0.1295	
Residuals	47	47627	1013.3			

As can be seen, the degree of darkness of final-/l/ is identified as having a significant effect on the degree of co-articulatory resistance of final-/l/ i.e. the lighter the color of final-/l/ (the higher the F2-F1 value) the higher the standard deviation (i.e. the lower the degree of co-articulatory resistance). Age, surprisingly given the results reported on above, was not retained as a factor in the best-fit model and gender turned out to be insignificant. A subsequent ANOVA test on the model-data, as provided in Table 6, confirms this basic analysis. Figure 9 shows the basic correlation between the color of final-/l/ (F2-F1) and CAD (inversely proportional to the standard-deviation of the F2-F1 values for final-/l/). Again, we clearly see that an increase in CAD (i.e. a decrease in standard deviation) as the final-/l/ darkens (i.e. as the F2-F1 value decreases).

While the linear-model and ANOVA test, the results of which are provided in Tables 5 and 6, did not show an age-effect, a conditional-inference tree analysis did pick up such an effect. Figure 10 clearly shows the effect of age. Subjects over 35 years of age (N=11) show a substantially higher level of standard deviation for the color (F2-F1) of final-/l/ (i.e. a lower degree of CAD) than those younger than 35 years of age (N=39). This is to be expected given the demonstrated links between age and /l/-darkening (Section 6.1.4) and /l/-darkening and CAD i.e. the younger the speaker, the darker the final-/l/ and the greater the degree of co-articulatory resistance for final-/l/.

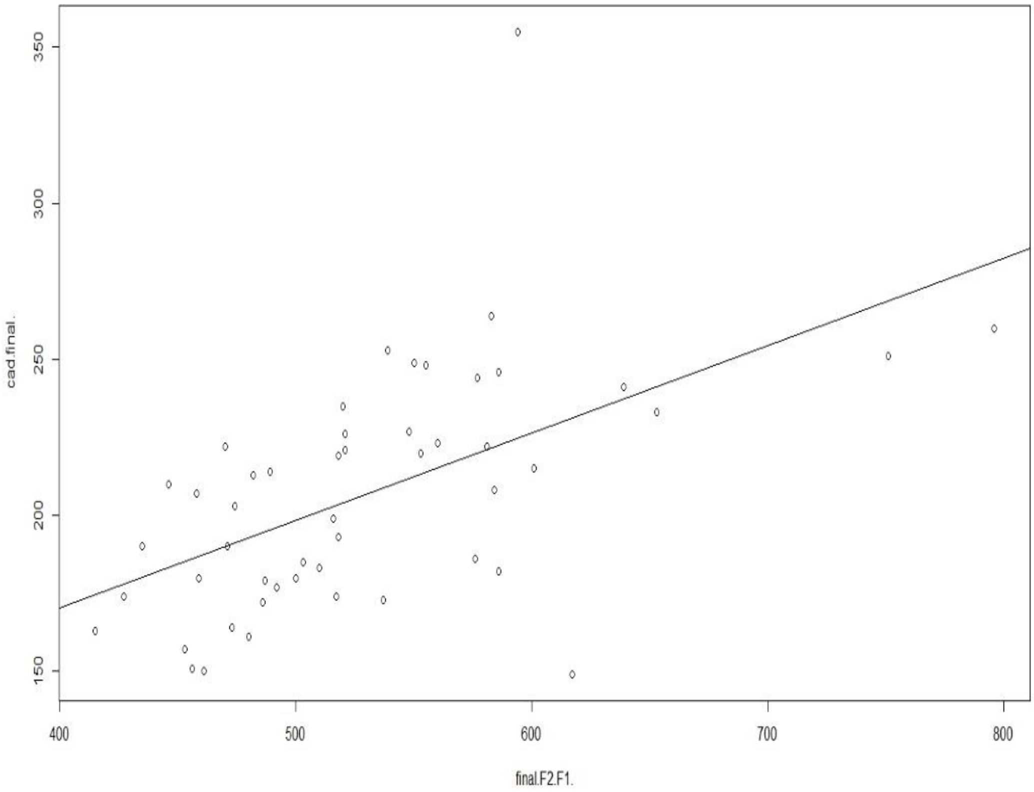

Figure 9: Plot showing linear correlation between color of final-/l/ (x-axis) and co-articulatory resistance of final-/l/ (y-axis) (N=50)

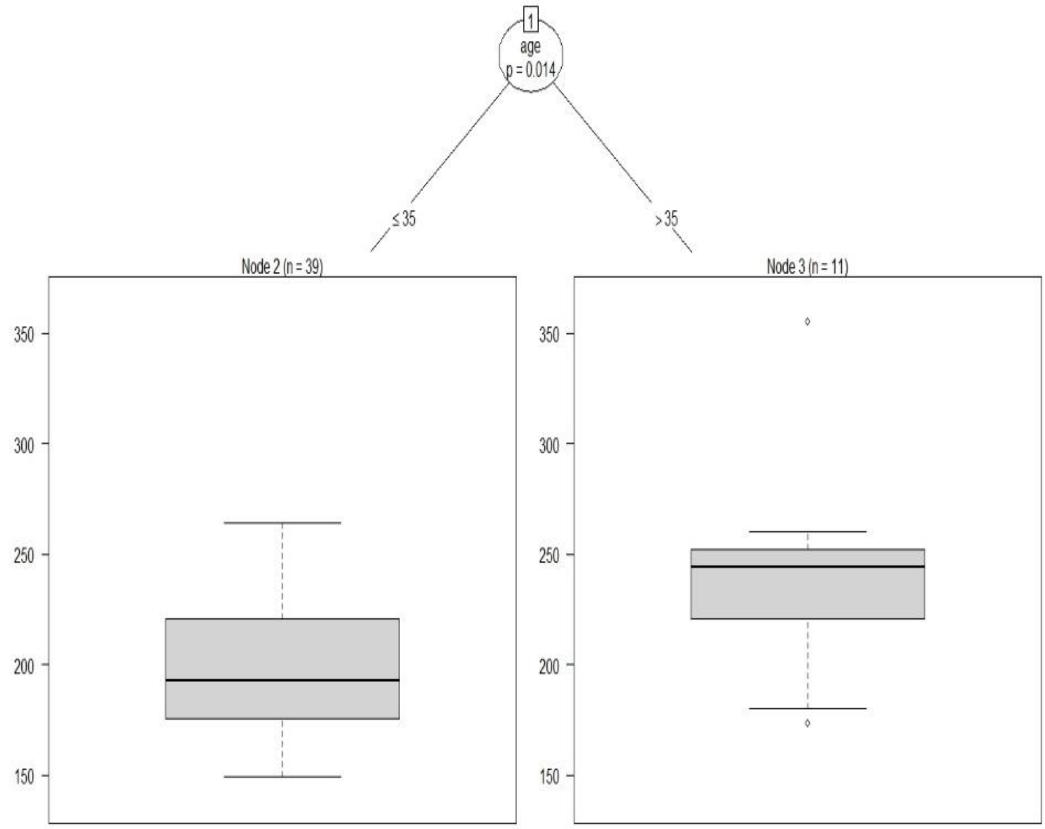

Figure 10: A c-tree showing the effect of age on the co-articulatory resistance of final-/l/ (N=50)

7. Discussion in relation to Hypotheses I-III

We return to the hypotheses provided in a general manner in Section 4 and then operationalized in Section 5 to check whether the results either confirm or disconfirm them.

Hypothesis 1 focused on resolving the disparity in the impressionistic literature on the quality of /l/ in SAfE i.e. the fact that Lanham, Wells and Trudgill all conclude that SAfE is a *Type 2* variety (i.e. clear /l/ in all positions), while Lass in various publications comes to the conclusion that SAfE is a member of *Type 3* (i.e. displaying clear-dark /l/-allophony). We speculated that one way to resolve this impasse was to assume that SAfE had undergone a language-change from a *Type 2* variety to a *Type 3* variety as a result of the phonologization and polarization of the two positional allophones of /l/. If this is the case then, firstly (i.e. *Hypothesis 1(a)*) one would expect that the various subjects would partition themselves into two distinct groups i.e. a younger cohort with F2-difference of greater than 400 Hz and an older cohort with an F2-difference of 200/300 Hz or less. Secondly (i.e. *Hypothesis 1(b)*), we would also expect to find a distinct correlation between the age of the subject and the F2 (as well as F2-F1) difference between the two positional allophones of /l/.

With respect to the F2-difference, and as confirmed by the results provided in Section 6.2, we found that there were no subjects displaying an F2-difference greater than 400 Hz; i.e. none of the subjects, even the youngest ones, displayed evidence of the phonologization of the two allophones of /l/; the overall F2-difference was 256.5 Hz i.e. as a whole SAfE displays intrinsic allophony in terms of Recasens' (2012) metric. On this basis, SAfE could only be either a *Type 1* or *Type 2* variety i.e. SAfE does not display an RP-like (*Type 3*) clear-dark /l/-allophony but rather the kind of intrinsic allophony characteristic of varieties like Irish English (*Type 2*) or Australasian English (*Type 1*).

Admittedly, there were, particularly among women, speakers who showed values between 300Hz and 400Hz, thus lying between the two cut-off points of Recasens' (2012) metric. Thus, with respect to *Hypothesis 1(b)*, what we discovered was no clear correlation between polarization and the age of the speaker, but rather a greater degree of polarization among women, although not to such a degree that it reached the 400 Hz cut-off. We will see below, in our discussion of Hypothesis 3 that this deals specifically with the prestige-driven palatalization of initial-/l/ first commented-upon by Lass (1995).

More importantly, and clearly illustrated in Figure 2, it is clear that while not a *Type 3* variety, SAfE is not a *Type 2* variety either, but clearly a *Type 1* variety (like the English of Leeds or Australasian English) i.e. neither of its positional allophones are clear in the absolute (i.e. not greater than 1500 Hz as per Recasen's (2012) 'bands') or relative sense: initial-/l/ is no more front than FOOT while dark-/l/ is clearly high-back in quality. This constitutes a novel finding with respect to the overall characterization of the SAfE liquid system and is in clear contrast with earlier impressionistic accounts. It does, however, make sense from a sociohistorical perspective given that SAfE's closest cousins, Australian and New Zealand English, display a similar overall dark (*Type 1*) nature.

Hypothesis 2 focused on co-articulatory resistance and assumed, given an overall polarization (attendant upon phonologization) of the color of the positional allophones of /l/ over time (inclusive of increased final-/l/ darkening), that a side-effect would be a greater degree of co-articulatory resistance of the final-/l/ of younger speakers. The results confirm both of these expectations: there was a clear correlation between the degree of final-/l/ darkening and CAD (see Figure 9) and the conditional inference tree analysis also picked up a clear age-effect (see Figure 10). Thus it is clear from the analysis of the data that, in GenSAfE, an increased darkening of final-/l/ is correlated with an increase in CAD and that, at the same time, younger speakers tend to be ahead with respect to this phenomenon. While this trend seems clear, the reasons for these trends were not as expected i.e. they were not the result of an overall change in SAfE from being a *Type 2* to a *Type 3* variety.

Hypothesis 3 focused on determining whether or not Lass' (1995, 2004) description of a prestige-driven greater degree of fronting of initial-/l/, especially among young women, was born out by the data. The results provided in, for example, Figure 7 clearly show a clear interaction between context (initial vs. final) and gender, with female speakers showing a comparatively fronted initial-/l. Lass' (1995, 2004) claims in this regard are thus at least partly borne out by the acoustic data (in the sense that the statistical analysis does not provide evidence for a complex interaction between context, gender *and* age).

8. Conclusion & Recommendations for Future Research

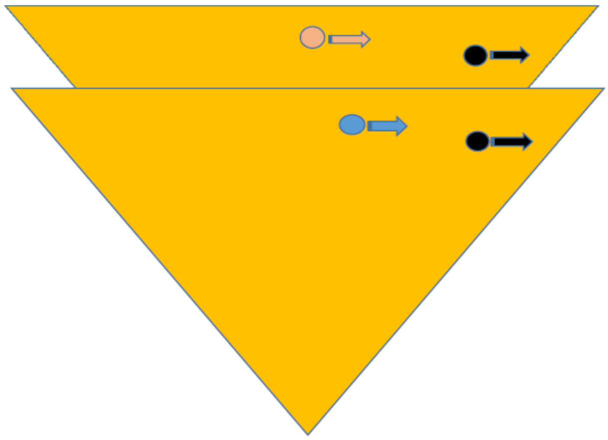

Figure 11: Schematic representation of the research results

Figure 11 provides a schematic representation of the overall results of this research[35]. It illustrates, in contrast with the impressionistic literature (which advocates for either RP-like clear-dark extrinsic allophony or for Irish-English-like clear-/l/ in both initial and final contexts), that South African English, like its Australasian cousins, has (always had) a relatively dark-/l/ and that, to boot, the difference between the two positional allophones of /l/ is not enough to warrant any conclusion other than that the difference in color is the result of universal phonetic pressures (i.e. intrinsic allophony). There is no evidence to suggest that South African English has, for example, seen a change from a Type 2 situation (with clear /l/ in both initial and final contexts) to a Type-3 clear-dark allophony. It seems that the impressionistic literature in this regard was simply mistaken. Clearly evident from Figure 11 as well is the clear backing of /l/ in apparent time, for both final-/l/ and initial-/l/. This appears to be the case for both genders. Given that the difference between initial-/l/ and final-/l/ appears to be maintained during this backing, the source of the change does not appear to be a process of phonologization (the result of which would have been polarization and the Type-3 clear-dark allophony mentioned already), but rather the simple shifting of the articulatory/acoustic target of /l/ in phonetic space. Lastly, we note the slightly larger difference between initial-/l/ and final-/l/ in the case of women (the female data reflected by the pink initial-/l/ in Figure 11), reflective of the fact that women tend to slightly front this positional allophone, presumably for prestige reasons.

Future research in this regard should focus on providing more nuance, both in terms of the internal constraints on /l/-color in SAfE and on the effect of independent social factors. In the case of the former, more research needs to be conducted, following Scobbie & Pouplier (2010) on liaison-/l/ (in *fill it*) and well as on the effect of morphosyntactic factors, particularly in relation to medial-/l/ e.g. whether the morpheme boundary in *feeling* has a darkening effect on the medial-/l/, as opposed to, for example, in *silly* where there is no morpheme boundary – as investigated in Turton (2014b) for various varieties of English. It would also be interesting to test, using articulatory methods such as ultrasound, whether the putative lack of L-vocalisation

[35] The triangles are schematically representative of the acoustic vowel space of the male (front triangle) and female (back triangle) subjects. The two black circles represent dark-/l/, the blue circle the initial-/l/ of males and the pink circle the initial-/l/ of females. The arrows represent the trajectories of change established in the results section.

mentioned in the impressionistic literature is in fact confirmable. Lastly, future research needs to be extended to investigate the other English liquid, /r/, as manifested in SAfE, especially given that there is evidence to suggest a polarity effect with /l/. In particular, Carter & Local (2007) have shown that, in general, where /l/ is light in a particular variety, /r/ is dark. The opposite also applies in other varieties. Kirkham (2017: 18) summarizes this state-of-affairs in the following manner:

> Carter and Local (2007) … confirm [a] polarity effect in [Newcastle and Leeds English] liquid systems, whereby varieties with clearer /l/s are more likely to have darker [ɹ]s in the same position, and varieties with darker /l/s are more likely to have clearer [ɹ]s. McDougall & Jones report a similar polarity effect for Australian English liquids. These results suggest that attending to /l/-/ɹ/ relationships may be an important factor in characterising liquid realisations by speakers of different varieties.

In terms of sociolinguistic nuance, the obvious place to begin would be to include a greater number of older speakers and to investigate other sites (e.g. Johannesburg) and sociolects (Broad South African English in particular). It would also be interesting to see whether other ethnic groups, particularly those currently engaged in the adoption of a GenSAfE-based pan-racial variety of English (Mesthrie 2010, 2017), mirror the phonetic details discovered in this research.

References

Bailey, R. 1984. Notes on South African English. *Southern African Journal of Linguistics*, 2/3: 1-45.

Barnes, J. 2006. *Strength and Weakness at the Interface: Positional Neutralization in Phonetics and Phonology*. Berlin & New York: Mouton de Gruyter. https://doi.org/10.1017/s0952675707001297

Beddor, P.S. 2009. A coarticulatory path to sound change. *Language*, 85(4): 407-428. https://doi.org/10.1353/lan.0.0165

Bekker, I. 2007. Fronted /s/ in General White South African English. *Language Matters*, 38(1): 46-74. https://doi.org/10.1080/10228190701640025

Bekker, I. 2009. The Vowels of South African English. Unpublished PhD thesis, North-West University.

Bekker, I. 2013. Nursing the CURE: A phonetic analysis of /ʊə/ in South African English. *Stellenbosch Paper in Linguistics*, 42: 1-39. https://doi.org/10.5842/42-0-168

Bekker, I. 2017. Earlier South African English. In R. Hickey (ed.) *Listening to the Past: Audio Records of Accents of English*. Cambridge: Cambridge University Press. pp. 464-483. https://doi.org/10.1017/9781107279865.020

Bekker, I. and G. Eley. 2007. An acoustic analysis of White South African English (WSAfE) monophthongs. *Southern African Linguistics and Applied Language Studies,* 25(1): 107-114. https://doi.org/10.2989/16073610709486449

Bowerman, S. 2004. White South African English: Phonology. In E. Schneider, K. Burridge, B. Kortmann, R. Mesthrie and C. Upton (eds.), *A Handbook of Varieties of English*. Berlin: Mouton de Gruyter. pp. 931-942. https://doi.org/10.1515/9783110175325.1.931

Bughwan, D. 1970. An Investigation into the Use of English by the Indians of South Africa. Unpublished UNISA PhD thesis.

Chomsky, N. and M. Halle. 1968. *The Sound Pattern of English*. New York: Harper & Row.

Carter, P. and J. Local. 2007. F2 variation in Newcastle and Leeds English liquid systems. *Journal of the International Phonetic Association*, 37(2): 183-199. https://doi.org/10.1017/s0025100307002939

Chevalier, A. 2016. Globalisation versus internal development: the reverse short front vowel shift in South African English. Unpublished PhD thesis, University of Cape Town.

Cho, T. and J. McQueen. 2008. Not all sounds in assimilation environments are perceived equally: Evidence from Korean. *Journal of Phonetics,* 36(2): 239-249. https://doi.org/10.1016/j.wocn.2007.06.001

Hall, N., N. Vasquez, F. Aguirre, M. Damanhuri and C. Tree. 2017. Long-distance liquid coarticulation in American English. *Proceedings of AMP 2016*. https://doi.org/10.3765/amp.v4i0.4012

Harrington, J. 2007. Evidence for a relationship between synchronic variability and diachronic change in the Queen's annual broadcasts. In J. Cole and J. Hualde (eds.) *Laboratory Phonology 9*. Mouton: Berlin. pp. 125-142.

Harrington, J. 2012. The relationship between synchronic variability and diachronic change. In A.C. Cohn, C. Fougeron and M. Huffman (eds.) *The Oxford Handbook of Laboratory Phonology*. Oxford: Oxford University Press. pp. 321-332. https://doi.org/10.1093/oxfordhb/9780199575039.001.0001

Holmes-Elliott, S. and J. Smith. 2018. Dressing down up north: DRESS-lowering and /l/ allophony in a Scottish dialect. *Language Variation and Change*, 30: 23-50. https://doi.org/10.1017/s0954394517000278

Hothorn, T., K. Hornik and A. Zeileis. 2006. Unbiased recursive partitioning: A conditional inference framework. *Journal of Computational and Graphical Statistics,* 15(3): 651-674. https://doi.org/10.1198/106186006x133933

Hualde, J.I., M. Simonet and M. Nadeu. 2011. Consonant lenition and phonological recategorization. *Laboratory Phonology,* 2: 275-300. https://doi.org/10.1515/labphon.2011.011

Huffman, M.K. 1997. Phonetic variation in intervocalic onset /l/'s in English. *Journal of Phonetics*, 25(1): 115-141. https://doi.org/10.1006/jpho.1996.0038

Hyman, L.M. 1976. Phonologization. In A. Juilland (ed.) *Linguistic Studies Presented to Joseph H. Greenberg*. Saratoga: Amma Libri. pp. 407-418.

Hyman, L.M. 2013. Enlarging the scope of phonologization. In A.C.L. Yu (ed.) *Origins of Sound Change: Approaches to Phonologization*. Oxford: Oxford University Press. pp. 3-28. https://doi.org/10.1093/acprof:oso/9780199573745.003.0001

Kerswill, P. and P. Trudgill. 2005. The birth of new dialects. In P. Auer, F. Hinskens and P.Kerswill (eds.) *Dialect Change: Convergence and Divergence in European Languages*. Cambridge University Press: Cambridge. pp. 196-220. https://doi.org/10.1017/cbo9780511486623.009

Kirby, J. 2013. The role of probabilistic enhancement in phonologization. In A.C.L. Yu (ed.), *Origins of Sound Change: Approaches to Phonologization*. Oxford: Oxford University Press. pp. 228-246. https://doi.org/10.1093/acprof:oso/9780199573745.003.0011

Kirkham, S. 2013. *Ethnicity, social practice and phonetic variation in a Sheffield secondary school*. Ph.D. dissertation, University of Sheffield.

Kirkham, S. 2017. Ethnicity and phonetic variation in Sheffield English liquids. *Journal of the International Phonetic Association*, 47(1): 17-35. https://doi.org/10.1017/s0025100316000268

Kuznetsova, A., P.B. Brockhoff and R.B. Christensen. 2017. lmerTest package: tests in linear mixed effects models. *Journal of Statistical Software,* 82(13): 1-26. https://doi.org/10.18637/jss.v082.i13

Ladefoged, P. 1965. Review of Lehiste, I. Acoustic characteristics of selected English consonants. *Language*, 41(2): 332-338. https://doi.org/10.2307/411884

Ladefoged, P. and I. Maddieson. 1996. *The Sounds of the World's Languages*. Oxford: Blackwell.

Lanham, L.W. 1967. *The pronunciation of South African English: a phonetic-phonemic introduction*. Cape Town & Amsterdam: A.A. Balkema.

Lanham, L.W. 1978. South African English. In L. Lanham and K. Prinsloo (eds.) *Language and Communication Studies in South Africa: Current Issues and Directions in Research*. Oxford University Press: Cape Town. pp. 138-165. https://doi.org/10.1017/s0041977x00067288

Lanham, L.W. 1982. English in South Africa. In R. Bailey and M. Görlach (eds.) *English as a World Language.* Cambridge University Press: Cambridge. pp. 324-352.

Lanham, L.W. and C. Macdonald. 1979. *The Standard in South African English and its Social History*. Heidelberg: Julius Groos Verlag.

Lanham, L.W. and A. Traill. 1962. South African English Pronunciation. Witwatersrand University Press, Johannesburg. Reprinted from *English Studies in Africa* 5(2): 171-206, 1962. https://doi.org/10.1080/00138396208691061

Lass, R. 1990. A ‘standard’ South African vowel system. In S. Ramsaran (ed.) *Studies in the Pronunciation of English: A commemorative volume in honour of A.C. Gimson*. London & New York: Routledge. pp. 272-285. https://doi.org/10.1017/s0272263100011256

Lass, R. 1995. South African English. In R. Mesthrie (ed.) *Language and Social History: Studies in South African Sociolinguistics*. Cape Town: David Philip. pp. 89-106. https://doi.org/10.17159/sajs.2015/a0113

Lass, R. 2004. South African English. In R. Hickey (ed.) *Legacies of Colonial English: Studies in Transported Dialects*. Cambridge University Press: Cambridge. pp. 363-386. https://doi.org/10.1017/cbo9780511486920.015

Lee-Kim, S-I, L. Davidson and S. Hwang. 2013. Morphological effects on the darkness of English intervocalic /l/. *Laboratory Phonology,* 4: 475-511. https://doi.org/10.1515/lp-2013-0015

Lobanov, B. 1971. Classification of Russian vowels spoken by different speakers. *Journal of the Acoustical Society of America,* 49: 606-608. https://doi.org/10.1121/1.1912396

McDougall, K. and M.J. Jones. 2011. Liquid polarisation in Australian English. *17th International Congress of Phonetic Sciences* (ICPhS XIV), 595-598.

Morris, J. 2017. Sociophonetic variation in a long-term language contact situation: /l/-darkening in Welsh-English bilingual speech. *Journal of Sociolinguistics*, 21(2): 183-207. https://doi.org/10.1111/josl.12231

Mesthrie, R. 2010. Socio-phonetics and social change: deracialisation of the GOOSE vowel in South African English. *Journal of Sociolinguistics*, 14(1): 3-33. https://doi.org/10.1111/j.1467-9841.2009.00433.x

Mesthrie, R. 2017. Class, gender, and substrate erasure in sociolinguistic change: A sociophonetic study of schwa in deracializing South African English. *Language*, 93(2): 314-346. https://doi.org/10.1353/lan.2017.0016

Mesthrie, R., A. Chevalier and T. Dunne. 2015. A regional and social dialectology of the BATH vowel in South African English. *Language Variation and Change*, 24(3): 371-395. https://doi.org/10.1017/s0954394514000222

More, F., J. Shaw, S. Kawahara and T. Arai. 2018. Articulation strategies for English liquids used by Japanese speakers. *Acoustical Science and Technology*, 39(2): 75-83. https://doi.org/10.1250/ast.39.75

O'Grady, C. and I. Bekker. 2011. Dentalisation as a regional indicator in General South African English: An acoustic analysis of /z/, /d/ and /t/. *Southern African Linguistics and Applied Language Studies,* 29(1): 77-88. https://doi.org/10.2989/16073614.2011.583161

O'Hala, J.J. 1981. The listener as a source of sound change. In C.S. Masek, R.A. Hendrick and M.F. Miller (eds.) *Papers from the Parasession on Language and Behaviour*. Chicago: Chicago Linguistics Society. pp. 178-203.

O'Hala, J.J. 1993. The phonetics of sound change. In C. Jones (ed.) *Historical Linguistics: Problems and Perspectives*. London: Longman. pp. 237-278.

O'Hala, J.J. 2012. The listener as a source of sound change: an update. In M. –J. Solé and D. Recasens (eds.) *The Initiation of Sound Change, Perception, Production and Social Factors*. Amsterdam: Benjamins. pp. 21-36. https://doi.org/10.1075/cilt.323.05oha

Palethorpe, S. and F. Cox. 2003. Vowel modification in pre-lateral environments. Poster presented at the International Seminar in Speech Production, December, Sydney.

Recasens, D. 2012. A cross-linguistic study of initial and final allophones of /l/. *Speech Communication*, 54: 368-383. https://doi.org/10.1016/j.specom.2011.10.001

Recasens, D. and A. Espinosa. 2005. Articulatory, positional and coarticulatory characteristics for clear /l/ and dark /l/: Evidence from two Catalan dialects. *Journal of the International Phonetic Association,* 35(1): 1-25. https://doi.org/10.1017/s0025100305001878

Rosenfelder, I., J. Fruehwald, K. Evanini and J. Yuan. 2011. FAVE (Forced Alignment and Vowel Extraction) Program Suite. http://fave.ling.upenn.edu.

Scobbie, J.M. and M. Pouplier. 2010. The role of syllable structure in external sandhi: An EPG study of vocalisation and retraction in word-final English /l/. *Journal of Phonetics*, 38: 240-259. https://doi.org/10.1016/j.wocn.2009.10.005

Simonet, M. 2015. An acoustic study of coarticulatory resistance in "dark" and "light" alveolar laterals. *Journal of Phonetics,* 52(1): 138-151. https://doi.org/10.1016/j.wocn.2015.07.006

Sproat, R. and O. Fujimura. 1993. Allophonic variation in English/l/and its implications for phonetic implementation. *Journal of phonetics,* 21(3): 291-311.

Stoddart, J., C. Upton and J.D.A. Widdowson. 1999. Sheffield dialect in the 1990s: Revisiting the concept of NORMs. In Paul Foulkes and Gerald J. Docherty (eds.) *Urban voices: Accent studies in the British Isles*. London: Longman. pp. 72-89. https://doi.org/10.4324/9781315832470-12

Toefy, T. 2017. Revisiting the kit-split in Coloured South African English. *English World-Wide,* 38(3): 336-363. https://doi.org/10.1075/eww.38.3.05toe

Trudgill, P. 2004. *New-dialect Formation: The Inevitability of Colonial Englishes*. Edinburgh University Press: Edinburgh. https://doi.org/10.1111/j.1360-6441.2005.0286e.x

Turton, D. 2014a. Some /l/'s are darker than others: accounting for variation in English /l/ with ultrasound tongue imaging. *University of Pennsylvania Working Papers in Linguistics*, 20(2): 189-198.

Turton, D. 2014b. Variation in English /l/: Synchronic reflections of the life cycle of phonological processes. Unpublished PhD Thesis: University of Manchester.

Turton, D. 2017. Categorical or gradient? An ultrasound investigation of /l/-darkening and vocalization in varieties of English. *Laboratory Phonology: Journal of the Association for Laboratory Phonology,* 8(1): 13. https://doi.org/10.5334/labphon.35

Wells, J. 1982. *Accents of English*, Vols 1-3. Cambridge: Cambridge University Press.